

CONTINGENCY PEST MANAGEMENT GUIDE

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Armed Forces Pest Management Board
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-AFPMB TECHNICAL GUIDES-

This is one of a series of Technical Guides (TGs) published by the Information Services Division (ISD), Armed Forces Pest Management Board (AFPMB). The AFPMB is a directorate within the Office of the Deputy Under Secretary of Defense (Installations and Environment) that recommends policies and procedures, provides guidance, and coordinates the exchange of information related to pest management throughout the Department of Defense (DoD). As a unit of the AFPMB, the ISD collects, stores, and disseminates published and unpublished information on arthropod vectors and pests, natural resources, and environmental biology important to the DoD. Other ISD products include country- or region-specific Disease Vector Ecology Profiles (DVEPs). All TGs and DVEPs, as well as ISD's database of over 200,000 articles on pest management and medical zoology, are available at the AFPMB Web site <<http://www.afpmb.org>>.

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Inquiries, comments or suggestions for improving TGs may be directed to the Chief, ISD, at (301) 295-7476, FAX (301) 295-7473 or via <http://www.afpmb.org/forums/sendmessage.php>.

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I. INTRODUCTION

A. Purpose and Content

The purpose of the Contingency Pest Management Guide is to provide basic information on using pesticides to control insects that transmit disease and other pests during deployment situations worldwide. Use pesticides only as part of an integrated pest management (IPM) program. IPM is an approach that combines a variety of pest management methods--including physical, mechanical, educational, biological and chemical--to prevent medical injury or economic damage from pests and disease vectors. This Guide is not intended to be a substitute for the instructions found on all pesticide labels. Remember, when applying pesticides around U.S. personnel or as part of a U.S. operation, **the pesticide label is the law.**

This guide is intended to assist DoD service members, civilians and contract personnel plan for and perform best pest management practices during contingency operations in the absence of a formalized Theater or an installation/base camp approved IPM Plan. When such a plan exists, that document takes precedence over this technical guide. Commanders are responsible for implementing a pest management program to include a pest management plan, and a plan should be written and implemented for any operation that is expected to endure for an extended period.

See the AFPMB web site at <http://www.afpmb.org> for contingency-related entomological information.

B. Recording, Reporting, and Archiving Pesticide Use during Contingency Operations

Paragraph 5.4.6., [DoD Instruction 4150.07, DoD Pest Management Program](#), May 29, 2008 requires that pesticide use during military operations be recorded and archived. Pesticide applicators must record applications of all pesticides (except skin and clothing repellents) and other pest management activities performed during military operations, using DD Form 1532-1, *Pest Management Maintenance Record*, or a computer generated equivalent. If this is not possible, the same information will be recorded in the unit logbook, staff journal or in a similar expedient manner. Required information includes: 1) Date applied; 2) Area/Site/Building and country where the pesticide was used; 3) Target pest; 4) Pesticide name and EPA Registration Number (EPA Reg. No.); 5) Percent final concentration used; 6) Method of application; 7) Amount used; and 8) Who (name and rank) applied the pesticide.

Reporting pesticide use and archiving pesticide use records shall be accomplished in accordance with Military Service procedures.

Army Component Procedures:

- a. Reference: Para 4-7.p.(24-30), DA PAM 40-11, Preventive Medicine, 22 July 2005 (Rapid Action Revision 002, 19 October 2009).
- b. Each month, pesticide use records, generated by preventive medicine personnel and contract pest control personnel, will be consolidated by the unit commander, or LOGCAP manager and forwarded directly to the US Army Public Health Command (Provisional) (USAPHC PROV), ATTN: MCHB-TS-OEN, Aberdeen Proving Ground, MD 21010-5403, or email: pesticide.archival@amedd.army.mil.
- c. Units are to provide a copy to their chain of command for information purposes.
- d. Unit level field sanitation teams (FSTs) using pesticides approved according to FM 4-25.12 are not required to comply with this reporting requirement. Unit level FSTs using pesticides not approved according to FM 4-25.12 are required to comply. As a best practice, all pesticide use by unit level FSTs should be documented in the unit journal or logbook.

Navy Component Procedures:

- a. Reference: Memorandum, DASN (I&E), Subject: Recording and Archiving Pesticide Use during Military Operations, April 27, 1999.
- b. Active and Reserve Component Medical Department Personnel, and contractors, who apply pesticides during military operations ashore and afloat will record pesticide use on DoD Form 1532-1. Each month, pesticide use records, generated by **ground forces** Medical Department personnel and contractors will be consolidated by the Commander, Commanding Officer, Officer in Charge, or Master of Military Sealift Command ships and forwarded directly to the Navy and Marine Corps Public Health Center (NMCPHC), ATTN: Expeditionary Preventive Medicine, 620 John Paul Jones Circle, Portsmouth VA 23708-2103, or e-mail to epm@nehc.mar.med.navy.mil for archiving. For pesticide use on **ships**, pesticide reports are emailed to nece-1532-1@med.navy.mil (DSN 942-2424, Dr. Andy Beck).
- c. Major claimants are free to determine whether or not local reporting and archiving is necessary.

Air Force Component Procedures:

- a. Reference: AFI 32-1053, Integrated Pest Management Program 23 June, 2009
- b. DoD pesticide applicators and contract pesticide applicators shall record pesticide use. Each month, pesticide use records (DD Form 1532, Pest Management Report, or IPMIS report) will be sent to the supporting MAJCOM Pest Management Professional (PMP). After a review (not to exceed one month), the MAJCOM PMP will route a copy of these records to HQ AFCEA/CEOA, 139 Barnes Dr., Suite 1, Tyndall AFB 32403-5319 who will forward contingency pest management records to the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) in accordance with DODI 6490.03, Deployment Health, for archiving in the Defense Occupational and Environmental Health Readiness System (DOEHS) for permanent archiving.

Navy or Air Force Component under Army Command as part of a Land Component Command Operation

Procedures: Navy and Air Force personnel that are assigned to land-based Land Component Command (Army) organizations should follow procedures as identified for the Army Component. Examples of such situations included Navy and Air Force personnel assigned to Provincial Reconstruction Teams, Embedded Training Teams, Military Training Teams, and as an Individual Augmentee.

C. Applying and Purchasing Pesticides in Foreign Countries

Different rules concerning the application of pesticides may apply in areas outside the jurisdiction of the Environmental Protection Agency (EPA). As prescribed in [DoD Guide 4715.05-G, Overseas Environmental Guidance Document, May 2007](#), the DoD should follow the Final Governing Standards (FGSs) for installations in each host country. These standards, which include pesticide applications, were developed by comparing an overseas environmental baseline (based on U.S. laws and regulations) with the host nation's standards. For countries without FGSs, or for operations outside a military installation, the DoD policy is to adhere to EPA requirements. For NATO operations, [STANAG 2048, Chemical Methods of Insect and Rodent Control](#), provides a list of pesticides approved for use by member nations.

EPA-registered pesticides will normally be used even during military deployment operations. However, during emergency conditions, non EPA-registered pesticides may be procured locally, but only after approval as outlined in Appendix H, *Approval for Local Purchase of Pesticides during Deployment Operations*.

D. Controlling Pests Not Listed on the Label

Whenever you are outside the U.S., you may encounter disease vectors not listed on your pesticide labels. Examples are: kissing bugs that transmit Chagas' disease in Central and South America; tsetse flies that transmit sleeping sickness in Africa; and phlebotomine sand flies that transmit leishmaniasis and sand fly fever in many parts of the world. Take the following steps to identify the pesticides to control these vectors:

- Determine from an entomologist or from reference material how and where the insect lives during various stages of its life cycle.
- Determine the life stage(s) most susceptible to lasting control.
- Identify a pesticide labeled for controlling a familiar pest at the same site or location as the insect you want to control.

NOTE: You may apply a pesticide to control pests not listed on the label, if the label allows the pesticide to be used at the same site to control another pest. For example, during the day, kissing bugs hide in cracks and crevices indoors and within woodpiles outdoors. From experience, you know that cockroaches also inhabit cracks and crevices within dwellings, and spiders take refuge at the same outdoor sites as kissing bugs. Therefore, you can use the labeled treatment methods to apply a pesticide labeled for these familiar pests to control kissing bugs found at the same sites.

When you can't find exactly the same site on a label and have no further guidance, carefully consider the available options, and choose the pesticide labeled for use at the most comparable site against the most similar pest. You may occasionally make a mistake and perhaps experience a control failure or other problems. However, you should still be confident you chose the best available pesticide and the benefits of controlling the pests outweighed the risks involved.

E. Importance of Sanitation

Good sanitation and proper waste disposal under contingency conditions are the most important principals in combating disease pests such as filth flies and rodents. Even in mobile field situations, these *camp followers* have historically amplified sanitation problems, often causing epidemics of diarrheal diseases. This threat is even greater in urban areas converted to temporary or semi-permanent military use because personnel will not move every day to a different, cleaner area. In this situation, cockroaches and rodents may join other pests associated with poor sanitation in compounding the problem, especially in and around structures used for food storage, preparation and consumption, and buildings used for troop housing. All these pests must be controlled, but only in conjunction with efforts to correct the sanitation problems that provide them food, breeding areas, and harborage.

The unit commander is responsible for field sanitation. However, it is your responsibility as a preventive medicine or pest control technician to inform your commander on how to make improvements. Successful pest control requires that you establish and maintain good sanitation practices. You can't control pests with pesticides alone.

F. Safety Requirements

When working with pesticides and pest management equipment. Safety is paramount! A dangerous temptation in training or contingency operations is to relax safety requirements. Some people think, “the rules don’t apply here”. Yielding to that temptation can cost you your health and the health of those around you. **REGARDLESS OF THE SITUATION OR THE LOCATION, ALL SAFETY REQUIREMENTS ON THE PESTICIDE LABEL MUST BE MET.** It does not take much planning to ensure that where there are pesticides, application equipment, and applicator personnel, the proper protective equipment is also on hand. There is no excuse for forgetting to bring protective equipment or for failing to use it. Most pesticide poisoning incidents occur when experienced people think safety requirements apply only to people with less experience or to situations where there is “more time” and fail to use personal protective equipment. The label precautions are there for a reason - **TO PROTECT THE HEALTH OF YOU AND THOSE AROUND YOU.** You should always use all required protective equipment. Supervisors should *never* let subordinates apply pesticides without proper protective equipment. **ALWAYS USE AND KNOW HOW TO WEAR YOUR PERSONAL PROTECTIVE EQUIPMENT**, and follow all directions, restrictions, and warnings for protecting the general population and non-target organisms.

G. Environmental Concerns

1. Negative Environmental Impacts

Concern for the environment should be a consideration during contingency operations. The impact of proper and improper pesticide application on the environment may play an important role in current and future host-nation relationships. You should understand that improper application and use of pesticides could pose a financial liability to the U.S. When applying pesticides, consider the following:

- Impact from drift and runoff to human and non-target animal species (birds, fish, bees, etc), plants.
- Potential groundwater contamination and/or spills.
- Development of pesticide resistance in target organisms.
- Disposal of empty pesticide containers and pesticide wastes.

2. Minimizing Negative Impacts

To minimize the negative impact of pesticides on the environment:

- Ensure that pesticide application is required.
- Adhere to label recommendations and restrictions.
- Select the pesticide that is least toxic to the environment and most specific for the pest to be controlled.
- Treat the smallest area needed to control the pest.
- Use only the amount of pesticide recommended on the label.
- Mix only what you need for the daily mission.
- Implement all possible precautionary measures to prevent any potential pesticide spills; report pesticide spills to your chain of command, contain spills if possible, keep pesticides from entering storm drains, wells, water systems, streams and rivers, and clean spills immediately in accordance with base or local procedures.

3. Pesticide Resistance

To minimize the potential for pests developing resistance to pesticides:

- When possible, implement non-chemical controls **FIRST** (including sanitation, pest avoidance, use of physical barriers, and pest source reduction) prior to applying pesticides. This does not mean that pesticides cannot be used during the early stages of pest control, but they should not be used in lieu of, or without consideration of other pest management methods.
- Avoid continuous use of a single pesticide class. Alternate pesticides with differing modes of action, including biopesticides.
- Consider what local agricultural pesticides are in use since pests may have developed resistance to these pesticides.
- If the situation allows, use pesticides that have a short residual life.
- Use compatible pesticide mixtures.
- Ensure applications are at or above the minimum rates specified on the label.

4. Reporting Pesticide Use

Record pesticide use during contingency operations on [DD Form 1532-1, Pest Management Maintenance Record](#), or a computer-generated equivalent. See paragraph I.B., above for details.

Personal-use pesticide applications (such as repellents) are exempt from reporting requirements.

5. Disposing of Pesticide Related Wastes

The proper disposal of pesticides and related waste products is a very important aspect of minimizing the detrimental effects of pesticides on the environment. During exercises and contingency operations in the U.S. or its territories, you must follow DoD and EPA guidance, or state and local requirements, **whichever is stricter**, for disposing of pesticides, rinse water, and pesticide containers.

For operations and exercises outside the EPA's jurisdiction, you must dispose of pesticides, rinse water, and pesticide containers in accordance with the Final Governing Standards (FGSs) or host-tenant agreements for the host country. If FGSs or other agreements do not exist, you must adhere to the EPA requirements or your own Service's regulations. **When there is an inconsistency between regulations, the more stringent requirement will be used.**

When supporting contingencies (such as combat operations in a hostile territory or allied country), you should still adhere to the principles of safe disposal for pesticides, rinse water, and pesticide containers. Even during hostilities, it is important to rinse spray equipment after use to keep it operational and to reduce the potential hazard of pesticide exposure between uses. Unused pesticides left in a sprayer (even for a day or two) can clog nozzles and deteriorate parts of the equipment so that the sprayer will not operate properly. To minimize the disposal problem, mix only the amount of pesticides that you know you are going to use. It is usually much easier and safer to mix an additional batch than it is to dispose of a full-strength spray left over because you mixed too much. If possible, take enough clean water to rinse the sprayer at the application site. The equipment rinse water can then be applied at the treatment site, or used as a diluent for the next application.

Excess, expired, or recalled pesticides should be turned in to an approved hazardous materials / hazardous waste collection point for proper disposal. Containers with pesticide in any form should never be disposed of in landfills or by burning in the field.

6. Empty Pesticide Containers

When disposing of empty pesticide containers, minimize health and environmental hazards by adhering to the following:

- Triple rinse empty pesticide containers and add the rinse water to the sprayer as a diluent.
- Follow the label specific instructions in respect to disposal of empty pesticide containers. To avoid possible use of pesticide containers by local population or unauthorized personnel, and crush or punch holes in the sides and bottoms of metal or plastic containers and bury, if time permits, preferably in a landfill or other designated area to prevent their reuse.
- Empty bags should be buried or burned.

To prevent troops in the field and local residents from using empty pesticide containers as cooking pots or water containers, **NEVER LEAVE OR BURY USABLE EMPTY PESTICIDE CONTAINERS, OF ANY SIZE, IN REUSABLE CONDITION.** Most pesticide labels include instructions and precautions for disposing of the container.

H. Controlling Biting Arthropods that are Disease Vectors

Throughout history, more casualties have resulted from disease transmitted (vectored) by arthropods (insects/arachnids, vectors) than injuries sustained during combat. "Vector-borne disease" is the term commonly used to describe an illness normally caused by a bacteria or virus transmitted to humans by blood-sucking arthropods. Vectors typically acquire a disease by feeding on infected vertebrates (e.g., birds, rodents, other larger animals, or humans) and passing it on to a susceptible person or other animal. Arthropods that most commonly serve as vectors include mosquitoes, fleas, lice, biting flies, bugs, mites and ticks.

Effective control of disease vectors requires developing and implementing a comprehensive program consisting of pre-deployment assessment of available information, on-site surveillance, deployment of control methods (chemical and non-chemical usually directed at multiple life stages) and re-assessment. Information regarding integrated pest management programs may be found through the Armed Forces Pest Management Board at www.afpmb.org.

I. Controlling Biting Arthropods that are Not Disease Vectors

Pre-deployment planning includes determining the disease vectors you will likely have to control in the area of operations. Be aware that biting pests that are not disease vectors can also pose a significant health threat and have caused many casualties during military exercises, and during actual contingency operations. These casualties were victims of secondary infections resulting from arthropod bites, or suffered severe allergic reactions to such bites. The greatest threats are in tropical and subtropical areas, where warmth and moisture promote rapid growth of fungal and bacterial infections, especially in field situations where there is little opportunity to keep clean and dry. Healing of minor wounds is very slow in the tropics and is usually retarded further because scratching continually reopens the bite site. Infectious organisms are often introduced by scratching. So even in areas relatively free of vector-borne diseases, plan on controlling biting pests that indirectly produce casualties from secondary infections or allergic reactions.

J. Controlling Venomous Arthropods

Stings, bites or other contact with venomous arthropods can result in dermatitis, severe neurological or cytological symptoms, localized or systemic allergic reactions, and secondary bacterial infections. Examples include bees, wasps, hornets, yellow jackets, spiders, centipedes, scorpions and urticating caterpillars. Personnel should be taught to recognize local venomous arthropods and ways to avoid them when living in the field. Management of these pests usually involves a localized response to include habitat modification, limited pesticide application to include residuals and baits and environmental sanitation. Additional information about venomous arthropods may be found in the Field Guide to Venomous and Medically Important Invertebrates Affecting Military Operations: Identification, Biology, Symptoms and Treatment at http://www.afpmb.org/pubs/Field_Guide/field_guide.htm.

K. Controlling Snakes

Snakes can negatively impact military operations. Their presence alone is sufficient to cause anxiety among troops, sometimes enough to negatively impact performance. However, only venomous snakes pose a serious health threat to people. Venomous snakes are found in almost every habitat, potentially impacting military operations throughout the world. Fortunately, most are harmless with only a few venomous species in any region. If poisonous species cannot be positively identified, assume all are venomous and leave them alone.

If control is necessary, great care must be taken to avoid bites. Preventive measures include removing rodents and their harborage from the area (reducing access to potential food sources), clearing excess clutter and monitoring living and working areas, reducing potential access sites. If snake removal is necessary, glue boards may be used in certain circumstances. Additionally, physically removing snakes using snake tongs may be required, but should only be attempted by trained and experienced personnel. Additional information concerning snakes may found in The United States Air Force Guide to Operational Surveillance of Medically Important Vectors and Pests (http://www.afpmb.org/coweb/guidance_targets/vector_and_pestcontrol/Operational_Surveillance_Guide.pdf) or the Armed Forces Pest Management Board Technical Guide 43 “Guide to Pest Surveillance During Contingency Operations” (http://www.afpmb.org/coweb/guidance_targets/vector_and_pestcontrol/Operational_Surveillance_Guide.pdf).

L. Controlling Schistosomiasis

Schistosomiasis is a threat in many tropical and subtropical regions where sanitation is poor. In some areas nearly all the human population is infected. Standing or moving water contaminated with the feces or urine of infected individuals contains eggs of the microscopic worm that causes schistosomiasis. Newly hatched forms enter the intermediate host--aquatic snails. Free-swimming infectious forms eventually emerge from the snails and penetrate the skin of humans bathing, swimming, or wading in infested waters. In areas where schistosomiasis is endemic, assume that all standing or moving water is infested, until proven otherwise. For additional information, visit the US Army Public Health Command (PHC) Fact Sheet on schistosomiasis at: <http://chppm-www.apgea.army.mil/HIOFS/>.

All field uniforms provide substantial, but not complete, protection from penetration by infectious forms (assuming trousers are intact and tucked into the boots, and exposed skin does not contact water). Repellents do not prevent worms from penetrating the skin, and there is no vaccine or preventive medication.

The best method of prevention is to avoid contact with water that may be infested. When this is impossible, the most practical method of breaking the chain of infection is to eliminate the intermediate host snails (mollusks) by treating water with niclosamide as found in Bayluscide® 70% wettable powder. Bayluscide® is currently EPA-registered for use as a molluscicide for control of fresh-water snails. In endemic areas, local/regional health officials, representatives of international health organizations or nearby medical entomology points of contact (see Appendix D) may provide information on emergency local sources.

M. Feral Animal Control and Injury and Disease Prevention and Control

1. **General Considerations.** Feral animals, particularly cats and dogs, are commonly encountered during contingency operations. Installation/Base Camp Commanders are responsible for military or contracted control of feral animals to include cost, performance, and personnel. Unit Commanders are responsible for implementing practices which prevent casualties, disease and/or injury, caused by association with feral animals. Veterinary and public health/preventive medicine personnel support commanders by providing guidance and consultation regarding theater policies for health and safety of animal control staff, oversight of animal welfare including safe, effective and humane animal euthanasia, and control of human injury and disease related to feral animals. Rabies represents the greatest disease risk from feral animals throughout the world.

2. **Veterinary Considerations.** Reference: AR 40-905 (http://www.army.mil/usapa/epubs/pdf/r40_905.pdf) and procedures set forth in the American Veterinary Medical Association Panel on Euthanasia. Army veterinary authorities coordinate measures for preventing injury and disease as related to feral animals. Army veterinarians ensure the investigation of animal diseases and recommend measures for prevention and control. These activities include—

- Maintaining liaison with local, or host nation health authorities and evaluating the extent of animal disease in areas near or on military base camps or sites.
- Coordinating with the base camp, public health/preventive medicine and pest management staffs, including contractors involved in pest management support, to control feral animals capable of causing injury or transmitting animal diseases and for disposal of dead animals found on the base camp or site.
- On those military base camps or sites where a formal disease control program is ongoing (for example, plague), establishing procedures ensuring that animals will not be disposed of without coordination with the installation veterinary representative.
- **Army veterinarians are responsible for oversight of euthanasia programs** that control animal diseases and stray animal populations, and may perform euthanasia services in locations where veterinary personnel are stationed and when within the mission priority of the commander.
- For unique missions where direct support from Army veterinarians is not available, personnel will follow Theater Guidance.

3. **Public Health/Preventive Medicine/Pest Management Considerations.**

- Assist Army veterinary authorities to establish Theater and local base camp and site guidance for controlling feral animals.
- Determine procedures for handling, holding and transporting trapped feral animals if no on-site veterinary support is present or available.
- If transport to a veterinary activity is not practical or not possible, determine from the supporting Army Veterinary activity how to dispose of feral animals.

4. For unique missions where guidance is not available, personnel should seek guidance from the supporting veterinary activity. Assistance in locating the supporting veterinary activity may be obtained by contacting the DoD Veterinary Service activity at <http://www.veterinaryservice.army.mil>. If guidance on pest management support is needed, contact the AFPMB's Contingency Liaison Officer via <http://www.afpmb.org/forums/sendmessage.php>.

N. Use of Herbicides Outside the United States

1. Wartime Use

[Executive Order 11850, Renunciation of Certain Uses in War of Chemical Herbicides and Riot Control Agents, 8 April 1975](#), outlines the U.S. policy on wartime use of herbicides. The United States has renounced first-use of herbicides in war except under regulations applicable to their domestic use on bases or for control of vegetation around the immediate defensive perimeters of bases. **Only the President of the United States may authorize other wartime uses.** Under no circumstances will large area aerial application of herbicides be conducted in the combat theater without approval of the President.

The local commander's decision to request the use of herbicides during wartime must be carefully considered and should be based on the following requirements:

- Application of herbicides is the safest or most effective way to solve the problem.
- Temporary facilities will not relocate before herbicides will serve their intended purpose.
- Loss of vegetation will not reduce security of present or future operations (e.g., compromise the location of otherwise undetectable positions).
- The desired effect can be achieved with designated contingency herbicides such as Glyphosphate (a foliar-absorbed weed killer) whenever possible.

2. Peacetime Use

Outside the United States and its territories, use of herbicides by the U.S. military is greatly restricted even during peacetime operations (including exercises). The peacetime use of herbicides within and around U.S. installations is under the authority of the commander of the applicable unified or specified command. For combat contingencies short of declared war, seek recommendations through legal services prior to taking any action.

a. On-Installation Applications

Herbicides may be used OCONUS within U.S. bases, posts, or installations for control of vegetation. [NOTE: Bases and posts are included in the term *installations*. The U.S. controlled portions of foreign installations are considered U.S. installations.] During OCONUS exercises, you may apply herbicides within existing U.S. installations to the extent that application is already authorized in the installation's current IPM Plan. Coordination with and permission of the installation commander or designated representative are required prior to using herbicides.

b. Off-Installation Applications

Off-base uses of herbicides (including applications to the area immediately outside perimeters of U.S. installations) during peacetime/exercises must be in accordance with the FGS (Paragraph C above) or with host-tenant agreements for the host country. Off-base permanent facilities on loan to U.S. forces during exercises, and temporary areas in the field (e.g., a temporary aircraft landing strips or field support areas set up in tents) are **not** considered U.S. installations, so peacetime use of herbicides in these areas must be in accordance with off-base OCONUS herbicide requirements listed above.

3. Informing the Chain of Command

Field commanders who desire to use herbicides may not be aware of all the restrictions. Before responding to an herbicide mission, ensure the chain of command is informed about the requirements and levels of authority for various herbicide uses as given in this section. The sources of this guidance are: Executive Order 11850, *Renunciation of Certain Uses in War of Chemical Herbicides and Riot Control Agents*, dated 8 April 1975; and Annex F to the current Joint Strategic Capabilities Plan, which provides implementing guidance from the Joint Chiefs of Staff to the Service components. Each Service may have supplementing regulations addressing the subject.

4. Segregate Herbicides from Pesticides

Avoid using the same equipment for dispersing both herbicides and insecticides. If you have a frequently recurring need for applying herbicides, it is better to designate specific sprayers for this purpose, and not use them for anything else. Extremely small amounts of certain herbicides (i.e. glyphosate) have a detrimental effect on most plants. It would be counterproductive to apply an insecticide for tick control around a defensive perimeter, only to discover a few days later that herbicide residues left in the sprayer defoliated or discolored the vegetation that camouflaged the fighting positions. The corrosive nature of herbicides further underscores the great importance of cleaning your spray equipment thoroughly after each herbicide mission. Be particularly careful when disposing of rinse water to prevent unwanted effects as described above.

O. Supporting Military Operations In Urban Areas

Most urban pest control efforts will be directed against often explosive populations of typical urban pests (e.g., mosquitoes, filth flies, rodents, and feral animals) associated with potential epidemics. The rapid spread of disease is facilitated by crowding of civilian populations, the establishment of displaced population camps, and the greatly reduced sectors and frontages of deployed combat forces. Good sanitation and field hygiene as well as full implementation of personal protective measures in our deployed forces is critical to successful mitigation efforts and should be continually stressed through the chain of command (see paragraph I.E., above, "Importance of Sanitation").

To prevent epidemics, even a single case of plague (flea-borne, from rodent reservoirs) or epidemic typhus (louse-borne) in the civilian or military population requires the immediate and highest priority effort to control the responsible vectors/reservoirs.

Another great concern is the convergence of displaced populations, deployed personnel, detainee, and enemy prisoner of war (EPW) camps. The size, location, and inherent problems of maintaining adequate sanitation and hygiene standards, coupled with the historically low state of health of EPWs and displaced populations, significantly contribute to the spreading of diseases among U.S. military forces. In these situations, vector surveillance and control efforts must be closely coordinated with the responsible civil affairs units and with the medical chain of command responsible for epidemiological surveillance and treatment of non-U.S. personnel.

II. CONTINGENCY PESTICIDES

The pesticides found on the contingency pesticide list are suitable for contingency use by one or more of the Military Services. The most current list and prices for the products listed in this Technical Guide are available from the AFPMB Contingency Pesticide List. The most current list is posted to the AFPMB web site at <http://www.afpmb.org/standardlist.htm>.

Refer to AF Joint Manual 24-204/TM 38-250/NAVSUP 505/MCO P4030.19G/DLAI 4145.3 [http://www.dscclia.mil/downloads/packaging/dlai4145_3.pdf], *Preparing Hazardous Materials for Military Air Shipments*, 1 March 1997, for additional guidance on air transportation of pesticides. The International Air Transportation Association's "Shippers Declaration for Dangerous Goods" form must be used for air transport of pesticides that are regulated. Service Focal Points jointly establish policy and to implement the manual. In accordance with paragraph 1.2.2. of the Joint manual, users should contact their Service Focal Points for all clarification and waivers:

Air Force. HQ AFMC/LGTP, 5215 Thurlow St., Wright-Patterson AFB, OH 45433-5540 Phone (513) 257-4503 DSN: 787-4503.

Army. U.S. Army Safety Center/CSSC-PP, Fort Rucker, AL 36362-5356 Phone (205) 255-3553 DSN: 588-3553.

Navy. Commander, Naval Supply Systems Command, Code 4122D, 1931 Jefferson Davis Highway, Arlington, VA 22241-5360, Phone (703) 607-1088 DSN: 327-1088. Navy Activities get waivers from Navy Ships Parts Control Center, Code 0541, P.O. Box 2020, Mechanicsburg, PA 17055-0788, Phone (717) 790-2784, DSN: 430-2784.

Marine Corps. Commander of Marine Corps (LPP-2), Headquarters, U.S. Marine Corps, 2 Navy Annex, Washington, DC 20389-1775, Phone (703) 696-1061, DSN: 226-1061.

Defense Logistics Agency/MMLSD, 8725 John J. Kingman Road, Suite 253, Ft Belvoir, VA 22060-6219. Phone (703) 767-3673, DSN: 427-3673.

A. Emergency Procurement of Pesticides and Pest Management Equipment

Emergency Procurement of Insect Repellents, Pesticides and Equipment: Deploying forces often need pesticides and equipment on short notice. The Defense Logistics Agency (DLA) has established Emergency Supply Operations Center (ESOC) to provide equipment and supplies to deploying forces with urgent requirements and in a timely manner.

For insect repellents, pesticides, pesticide application equipment, and personal protection equipment (bed nets, head nets, etc.) and respirators:

Contact the DLA Customer Interaction Center DLA Contact Center at Tel: 1-877-352-2255 or DSN: 661-7766. They are open 24/7 365 days a year for all customer inquiries and submittal of requisitions. Email and related info is listed below:

Email Address: DLAContactCenter@dla.mil

Phone: 1-877-352-2255

Phone: 269-961-7766

DSN: 661-7766

Fax: 269-961-7791

DSN Fax: 661-7791

For technical/quality/logistical/ordering inquiries/questions: contact the DLA Chemist at (804) 279-3995, DSN: 695-3995; cell 1-804-201-3682. Normal business hours are 0800-1700 hours weekdays EST. After normal duty hours, please use cell phone number.

B. Shipping Papers, Marking and Label Requirements

Shipping papers are required for all hazardous materials in transit. These papers should be within reach of transport drivers/operators at all times. Information contained on the shipping papers includes: proper shipping name, hazard class, UN identification number, reportable quantity (RQ) if applicable, and package quantities or weight.

Marking regulations require information on the specific hazardous material to be visible or "marked" on the outside of the package. Information required to be marked on the packages includes: proper shipping name, UN identification number, and consignor's or consignee's name.

Department of Transportation (DOT) labels must be attached to the outside of packages near the proper shipping name, providing information on the specific hazard class of the material (i.e., FLAMMABLE LIQUID) if applicable.

C. Shipping Information

The shipping information listed below is believed to be current, accurate and reliable, but may be incomplete due to revisions and/or not applicable to all conditions or situations that may exist or occur. Users must verify the suitability of this shipping information prior to use.

D. Contingency Pesticide Storage Guidance

1. Pest storage areas should be segregated from all other areas for reasons of health and safety, fire protection, environmental protection, and security. For example, if a fire occurs in a facility located within or adjacent to an office complex, extensive decontamination of nearby areas from drift of toxic vapors, smoke, liquids, and particulates is required.

2. Designated pesticide storage areas are essential to safely protect and store pesticides and related chemicals. Storage space may also be combined with, or accommodated in, the pesticide application vehicle and equipment space.

a. Storage areas shall be secured from unauthorized entry and be located in a secured area with minimum external access to non-Vector Control personnel.

b. Pesticide storage facilities will be hard stand buildings, milvans or other structures that are capable of being secured.

c. Pesticides shall be stored in a dry room or building where temperatures above 50° Fahrenheit and below 100° Fahrenheit can be maintained.

d. Pesticides will not be stored in a room with a floor drain of any type.

e. When no floor containment is available, all liquid pesticides will be placed on spill containment platforms capable of containing the amount of liquid stored on the platform. If commercial spill containment is not available, field expedient containment can be made using wooden frames and old water bladders.

f. Non-absorptive shelving will be used to store pesticides if available. If wooden shelves are used, the wood is to be turned in as HAZMAT when it is no longer needed.

g. There will be separate storage rooms or buildings for insecticides and herbicides, rodenticides and fly baits, and animal traps. If outdoor space is provided for pesticide storage the space shall be secure, have overhead cover and protected from the elements. Animal traps may be stored in outside facilities.

h. Herbicides and insecticides will be stored in separate rooms when possible. When this is not feasible, the pesticides shall be arranged so that clean air flows continuously from the insecticides past the herbicides and out of the facility. This is due to the potential for contamination of the insecticides with herbicides.

i. All storage facilities will be labeled on all sides with signs such as “DANGER,” “POISON,” and “PESTICIDE STORAGE AREA” to advise personnel of the contents and warn of their hazardous nature. If flammable liquids are stored then a “FLAMMABLE PESTICIDES” sign needs to be present. NO SMOKING signs should be located in the pesticide areas.

j. A list and MSDSs of the types of materials stored shall be posted on the outside of the storage area and a copy should be given to the installation on-scene hazardous waste coordinator and the fire department serving the base camp.

3. Every effort should be made to transition temporary pesticide storage facilities to more suitable portable or semi-permanent facilities when contingency operations exceed 1-year.

E. Pest Management Vehicles

1. Vehicles used to transport pesticides should be exclusively dedicated for this purpose and clearly identified as vector control vehicles. If vehicles cannot be designated as vector control vehicles, then vehicles used to transport pesticides will NOT be used to transport food, water, or medical supplies. Vehicles will be maintained with a clean and orderly appearance, free from observable pesticide spills, or residues.

2. Vehicles used to transport pesticides will be equipped with a fire extinguisher and a spill kit capable of handling the maximum amount of pesticide transported at any given time.

3. All pesticides carried on vehicles will be secured in locked compartments at all times. Compartments will be lockable and composed of non-absorbable material.

4. Vehicles will not be left unattended at any time unless they are properly locked and secured.
5. For all pesticides carried in a vehicle, the corresponding Material Safety Data Sheets will be maintained in the vehicle.

III. PESTICIDE RECOMMENDATIONS

Pesticide recommendations in this section are for use as a quick reference only, to help you identify your options from the list of contingency pesticides in Section II. Read the actual labels of the pesticides you are considering before making a final decision on which one to use. A specific pesticide may be provided to the military by more than one manufacturer, so label information may vary somewhat among products with the same NSN.

Pesticides are listed in alphabetical order within each section, NOT in order of preference. Most of the individual pesticides have several uses and are therefore listed under several pest groups. Note: Information on a pesticide in a given section applies only to its uses against the pest(s) in that section.

- The pesticides are diluted with water, unless otherwise stated.
- Pest groups on the following pages are listed in the order of the Table of Contents, page 4.
- Mineral oil is an acceptable line cleaning agent/diluent for use with the following pyrethroid ULV products listed in this guide: 3% Pyrethrins, NSN 6840-01-104-0780; Resmethrin, NSN 6840-01-359-8533. The following mineral oil products are available through the federal supply system:
 - 1 pint can: NSN 6505-00-664-0441
 - 1 gallon can: NSN 9150-01-522-3094
 - 5 gallon can: NSN 9150-01-522-3089

Consider using other integrated pest management options before relying on pesticides. See the DoD Pest Management Materials List Other than Pesticides at www.afpmb.org.

A. REPELLENTS (Work on multiple insect groups)

Repellent	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Repellent, Clothing Aerosol, 0.5% Permethrin 6840-01-278-1336	BX (12) 6 oz cans	Apply as formulated	Apply to clothing. DO NOT APPLY WHILE THE CLOTHING IS BEING WORN. Allow two hours for drying, or four hours under humid conditions. DO NOT use on hats, headgear, socks, underwear, FRACUS, FROG or NOMEX uniforms.
Insect Repellent, Clothing Application, IDA Kit 40% Permethrin 6840-01-345-0237	BX (12) kits	Apply in accordance with label instructions	Apply to clothing in the bags supplied with the kit. One kit, which contains two bags, will treat one BDU/ACU/DCU/ABU. Use one bag to treat the BDU/ACU/DCU/ABU shirt and one bag to treat the BDU/ACU/DCU/ABU trousers. Allow two hours for drying, or four hours under humid conditions. DO NOT use on hats, headgear, socks, underwear, FRACUS, FROG or NOMEX uniforms.
Repellent, Clothing 40% Permethrin 6840-01-334-2666	BX (12) 151 ml bottles	1 bt. to 2 gal water	For use in 2-gal. sprayer for treatment of BDU/ACU/DCU, bed nets and tents by trained personnel ONLY. Do not allow skin contact until treated surfaces dry. DO NOT use on hats, headgear, socks, underwear. FRACUS, FROG or NOMEX uniforms. NOTE: This method of treatment has not been tested on ABUs to confirm it offers effective bite protection.
Repellent, Personal 33% DEET Lotion (3M ULTRATHON) 6840-01-284-3982	BX (12) 2 oz tubes	Apply as formulated	Apply thin layer to exposed skin. Avoid contact with eyes and lips.
Insect Repellent, Personal Application & Camouflage Face Paint (New w/DEET) 6840-01-493-7309	BX 12 Compacts with 1.6 oz net contents per Compact	Apply as formulated	Apply thin layer to exposed skin. Avoid contact with eyes and lips.
Repellent, Personal, Ultra 30/LipoDEET 6840-01-584-8393	BX (12) 2 fl oz tubes	Apply as formulated	Apply thin layer to exposed skin. Avoid contact with eyes and lips.

Repellent	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Repellent, Personal Cutter Pump Spray Repellent 6840-01-584-8598	BX (12) 6 fl oz bottles	Apply as formulated	Apply thin layer to exposed skin. Avoid contact with eyes and lips.

B. BITING FLIES

Biting Fly Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Bifenthrin (Talstar P Professional) 7.9% 6840-01-525-6888	QT	0.33-1.0 oz per 1000 sq ft (0.02-0.06%)	Outdoor use. Apply outside as a residual spray to surfaces of buildings, porches, screens, window frames, eaves, patios, and refuse dumps. Higher application volumes may be used to obtain desired coverage of dense vegetation and landscaping materials where flies congregate. Do not apply water-based sprays in conduits, or electrical equipment because of the possible shock hazard. DO NOT use as a space spray.
Cyfluthrin (Tempo SC ULTRA) 11.8% 6840-01-313-7359	BX (12) 240ml bottles	8 ml to 16 ml /1000sqft or 8 ml to 16 ml/gal (0.025% - 0.05%)	For use as a general surface, crack and crevice and spot application in, on and around buildings and structures and on surfaces and other areas where pests have been seen. Labeled for use in aircraft. DO NOT use for space spray applications.
Insecticide, Cyfluthrin (Tempo Ultra WSP) 10% WP 6840-01-383-6251	BX 32 (50 gram) packets	1 or 2 packets/5 gal (0.025% - 0.05%)	For use as a general surface, spot application in and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Labeled for use on aircraft. DO NOT use for space spray applications.
Cypermethrin (Demon WP) 35.6% 6840-01-390-4822	LB 1 lb jar	1 packet/gal 0.1%	Apply indoors as a residual spray to walls, ceilings, window screens and other fly resting areas. Apply outside as a residual spray to surfaces of buildings, porches, screens, window frames, eaves, patios, and refuse dumps. Do not apply water-based sprays in conduits, or electrical equipment because of the possible shock hazard. DO NOT use as a space spray.
d-Phenothrin 2% Aerosol 6840-01-412-4634	CN 12 oz can	Pre-formulated Aerosol (2%)	Use as a space spray for aircraft disinsection, and in buildings, vans, ships, and in tentage. Spray 10 seconds per 1,000 cubic feet (10ft x 10ft x 10ft). Not to be used on aircraft with passengers and crew aboard.
Lambda-cyhalothrin (SURRENDER PESTAB) 10.0% 6840-01-431-3357	CO 40 tablets per Container	1 to 4 tablets/gal (0.015% - 0.06%)	For use as a general surface, spot application in and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Apply directly to walls, ceilings, window screens and other resting areas. May be used on exterior siding, foundations, porches, window frames, eaves, and other similar sites. Also may be applied to lawn areas around residential buildings and similar areas where pests are active. Labeled for use on aircraft. DO NOT store dilution in application equipment overnight.
Pyrethrins 3%, ULV Fog Concentrate 6840-01-104-0780	1-gal can	As directed on label	Dilute concentrate with petroleum distillate at the rate of one part concentrate to two parts oil and mix well. Use at a time when the air is cool and the wind velocity is approximately 5 mph. At dosage rate of fifteen ounces per minute upwind of the area to be controlled. If application equipment is truck mounted, keep speed approximately 5 mph.
Malathion (Fyfanon ULV) 96.5% 6840-01-169-1842	5-gal can	Apply undiluted except for thermal fog/fog use	For outdoor use only in ground or aerial ULV equipment. For application with ground equipment 2-4 oz/acre. For use with thermal fogs or fogs, apply 6-8 oz/100 gallons of finished solution. For thermal fogging dilute in diesel fuel, due to differences in fuel you may experience problems with sludge or solubility of the Fyfanon ULV. Label includes extensive directions for application, equipment calibration, and droplet size determination. Spray droplets may permanently damage paint on vehicles.

Biting Fly Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Naled (Dibrom Concentrate) 87.4% 6840-01-270-9765	30 gal drum	Apply undiluted	Ground Application: Applied undiluted as ULV for the control of mosquitoes, horn flies, and deer flies. May also be applied via thermal fogger when diluted in diesel fuel for the control of gnats, blackflies, houseflies, and mosquitoes. Is labeled for aerial application as ULV spray for the control of mosquitoes, horn flies, and deer flies. All equipment used in the mixing or application of DIBROM concentrate should be constructed of corrosion resistant materials. See label for more specific instructions.
Naled (Trumpet EC) 78% 6840-01-532-5414	30 gal drum	Apply undiluted	Aircraft application: Apply at the rate of 0.6 to 1.2 oz undiluted of diluted material per acre for smaller insects such as gnats and midges. Apply at the rate of 1 to 4 oz of undiluted material per acre for larger flies such as house flies. Use in residential areas, and municipalities, tidal marshes, swamps, woodlands, livestock and dairy cattle pastures, and feed lots. Ground Application: ULV Sprayer must be constructed out of corrosion-resistant materials.
Resmethrin + piperonyl butoxide (Scourge) 4.14% + 12.42% 6840-01-359-8533	CN 5 gal	As directed on label	For outdoor use only in portable backpack, ground or aerial ULV equipment. Label includes extensive directions for application, equipment calibration, and droplet size determination. May apply using ULV portable backpack equipment, mix with refined soybean oil, light mineral oil of 54 second viscosity (see above NSN) or other suitable solvent or diluent. RESTRICTED USE PESTICIDE

*NOTE: Pesticides labeled for use against adult mosquitoes may be used to control other biting flies, as long as:

- The target biting flies are at the same site as adult mosquitoes.
- The pesticide is applied according to directions for use against adult mosquitoes.
- The pesticide label does not prohibit use against the target pest.
- All other applicable label directions and precautions are followed.

C. BED BUG CONTROL

Bed Bug Control	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Bifenthrin (Talstar P Professional) 7.9% 6840-01-525-6888	QT	0.33-1.0 oz per 1000 sq ft (0.02-0.06%)	Application should be made to crack and crevices where evidence of bed bugs occurs. This includes bed frames, box springs, inside empty dressers and clothes closets, and carpet edges, high and low wall moldings and wallpaper edges. DO NOT use on bed linens, pillows, mattresses or clothes. Remove all clothes and other articles from dressers or clothes closets before application. All treated areas should be allowed to thoroughly dry prior to use. Not recommended as sole protection against bed bugs.
Cyfluthrin (Tempo Ultra WSP) 10.0% 6840-01-383-6251	BX 32 (50 gram) packets	1 or 2 packets/5 gal (0.025% - 0.05%)	Use higher rate for severe infestation, faster knockdown, and longer residual. Apply directly into voids, cracks and crevices using low pressure system with a pinpoint or variable pattern nozzle. DO NOT treat entire area of floor or floor covering. DO NOT apply where electrical short circuits can occur. DO NOT apply in occupied rooms. Occupants may return when surfaces have dried. DO NOT apply to furniture where prolonged contact by humans will occur. DO NOT apply as a space spray.
Deltamethrin (DELTADUST) 0.05% 6840-01-431-3345	LB 1 lb jar	Apply as formulated	Apply thoroughly to all areas where bed bugs are typically found including: folds and tufts of mattresses, coils of springs, cracks and hollow posts of bedsteads, upholstery of chairs and sofas, picture frame moldings and all cracks and crevices in the room should be treated. Allow powder to remain in contact with surface for 4-6 hours. Thoroughly vacuum treated areas, dispose of vacuum bags and place clean linens on bed.

D. COCKROACHES

Cockroach Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Cyfluthrin (Tempo SC ULTRA) 11.8% 6840-01-313-7359	BX (12) 240ml bottles	8 ml to 16 ml/1000 sq ft or 8-16 ml/gal (0.025% - 0.05%)	For use as a general surface, spot or crack and crevice application in, on and around buildings and structures. Make applications to surfaces and other areas where pests have been seen. Labeled for use in aircraft. DO NOT USE for space spray applications.
Insecticide, Cyfluthrin (Tempo Ultra WSP) 10% WP 6840-01-383-6251	BX 32 (50 gram) packets	1 or 2 packets/5 gal (0.025% - 0.05%)	Treat entry points such as around water pipes, doors, windows, and eaves. Treat areas where pests normally feed or hide such as baseboards, corners, under appliances/equipment. Spot treat floor or rugs beneath furniture or in closets as needed. DO NOT apply to entire floor. When applying in a food handling areas cover or remove all food processing and handling equipment before treatment. DO NOT apply to surfaces in food handling area when facility is in use. Labeled for use on aircraft. DO NOT USE for space spray applications.
Cypermethrin (Demon WP) 35.6% 6840-01-390-4822	LB 1 lb jar	1 packet/gal 0.1%	Indoor and outdoor use. Apply as a coarse, low pressure spray to areas where cockroaches hide, such as cracks and crevices.
Deltamethrin (DELTADUST) 0.05% 6840-01-431-3345	LB 1 lb jar	Apply as formulated	Apply indoors with a hand or power duster, paint brush or by other suitable means to non-food areas as a spot or crack and crevice treatment. Apply outdoors in sanitary sewers, building foundations/crawl spaces where pests are active.
Insecticide, Fipronil, cockroach, large size (Combat Quick Kill) 6840-01-224-1269	8 bait stations/ box/ 12 boxes	Apply as formulated	Apply indoors. Use all 8 baits. Break baits apart. Do not remove or puncture labels on bait stations. Place baits wherever you see or have seen roaches. Then place additional baits about 1-1/2 feet away. Place baits properly so they are touching walls or corners. Do not use sprays or foggers around bait stations. Replace all 8 baits every 6 months or sooner if roaches return.
Insecticide, Fipronil [Maxforce FC Roach Killer Bait Gel (3-Pak)] 6840-01-483-3065	3-60 gram reservoirs/ box/ 8 boxes	Apply as formulated	For indoor or outdoor use. Bait can be applied as spots or as a bead in cracks and crevices. Place bait at or near harborages or aggregation areas. Do not use sprays or foggers around baited areas. Application of this product in food/feed handling establishments other than as a crack and crevice treatment is not permitted. Outdoors, apply in protected areas when possible. Environmental stressors such as direct sunlight and water will reduce effectiveness. Use Syringe, Maxforce Bait Injector, NSN 3740-01-483-3012 to apply bait.
Insecticide, Fipronil [Maxforce FC Roach Killer Bait Gel (Reservoir)] 6840-01-471-5650	4-30 gram reservoirs/box	Apply as formulated	For indoor or outdoor use. Bait can be applied as spots or as a bead in cracks and crevices. Place bait at or near harborages or aggregation areas. Do not use sprays or foggers around baited areas. Application of this product in food/feed handling establishments other than as a crack and crevice treatment is not permitted. Outdoors, apply in protected areas when possible. Environmental stressors such as direct sunlight and water will reduce effectiveness. Use Syringe, Maxforce Bait Injector, NSN 3740-01-483-3012 to apply bait.
Lambda-cyhalothrin (SURRENDER PESTAB) 10.0% 6840-01-431-3357	CO 40 tablets per container	1 to 4 tablets/gal (0.015% - 0.06%)	For use as a general surface, spot application in and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Apply as a coarse low pressure treatment to areas where the pests hide such as baseboards, corners, storage areas, closets, behind and under refrigerators, sinks, furnaces, and stoves, cracks and crevices and other similar areas. Also this pesticide may be applied to lawn areas around residential buildings, refuse dumps, and similar areas where pests are active. Labeled for use on aircraft. Do not store dilution in application equipment overnight.

Cockroach Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Pyrethrins 3%, ULV Fog Concentrate 6840-01-104-0780	1-gal can	As directed on label	As a space spray, use undiluted. Close room or warehouse and shut off all ventilation systems. Dispense this product as a fine mist in the air above fruit trays and shelves. Use a dosage not exceeding ½ gallon per 50,000 cubic feet of room space. Leave room closed for one hour. Do not remain in treated areas and ventilate before re-entry. As a contact spray, apply into all cracks and crevices in woodwork, walls, floors, underneath sinks, behind pipes and in all places where insects shelter. Contact as many insects as possible. Do not allow spray to contact stored food. Use at a dosage rate of approximately one half fluid ounce per 1,000 cubic feet of room space. Leave room closed for one hour. Do not remain in treated areas and ventilate before re-entry.

E. FILTH FLIES

Filth Fly Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Bifenthrin (Talstar P Professional) 7.9% 6840-01-525-6888	QT	0.33-1.0 oz per 1000 sq ft (0.02-0.06%)	Outdoor use. Apply outside as a residual spray to surfaces of buildings, porches, screens, window frames, eaves, patios, and refuse dumps. Higher application volumes may be used to obtain desired coverage of dense vegetation and landscaping materials where flies congregate. Do not apply water-based sprays in conduits, or electrical equipment because of the possible shock hazard. Do not use as a space spray.
Cyfluthrin (Tempo SC ULTRA) 11.8% 6840-01-313-7359	BX (12) 240ml bottles	8 ml to 16 ml/1000 sq ft or 8-16 ml/gal (0.025% - 0.05%)	For use as a general surface, crack and crevice, and spot application in, on and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Labeled for use in aircraft. Do not use as space spray.
Insecticide, Cyfluthrin (Tempo Ultra WSP) 10% WP 6840-01-383-6251	BX 32 (50 gram) packets	1 or 2 packets/5 gal (0.025% - 0.05%)	For use as a general surface, spot application in and around buildings/structures and transportation. Make applications to surfaces and areas where pests rest. Labeled for use on aircraft. Do not use for space spray applications.
Cypermethrin (Demon WP) 35.6% 6840-01-390-4822	LB 1 lb jar	1 packet/gal 0.1%	Apply indoors as a residual spray to walls, ceilings, window screens and other fly resting areas. Apply outside as a residual spray to surfaces of buildings, porches, screens, window frames, eaves, patios, and refuse dumps. Do not apply water-based sprays in conduits, or electrical equipment because of the possible shock hazard. Do not use as a space spray.
d-Phenothrin 2% Aerosol 6840-01-412-4634	CN 12 oz can	Pre-formulated Aerosol (2%)	Use as a space spray for aircraft disinsection, and in buildings, vans, ships, and in tentage. Spray 10 seconds per 1,000 cubic feet (10ft x 10ft x 10ft). Not to be used on aircraft with passengers and crew aboard.
Pyrethrins 3%, ULV Fog Concentrate 6840-01-104-0780	1-gal can	As directed on label	Dilute concentrate with petroleum distillate at the rate of one part concentrate to two parts oil and mix well. Use at a time when the air is cool and the wind velocity is approximately 5 mph. At dosage rate of fifteen ounces per minute upwind of the area to be controlled. If application equipment is truck mounted, keep speed approximately 5 mph.
Fly Bait (Blue Streak/ Golden Malrin/Stimukill) 1 % Methomyl 6840-01-183-7244	CN 5 lb can	Premixed Bait (1.0%)	For outdoor use only. Distribute bait from container or other device. Avoid contact with skin, eyes and clothing. Scatter Application. Bait should be scattered over specified fly feeding areas (or military equivalent sites) daily or as needed. Scatter bait (do not put in piles). Bait Stations. Use 1.6 oz of bait per station – place 1 Bait station per 250 sq ft in area to protect. Place bait stations 4 ft off the ground. Paint-on-Applications. Add water to bait to form a paste – apply to fly resting areas, avoid resting areas that are dusty.

Filth Fly Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Fly Bait (Maxforce) 0.5% Imidacloprid; 0.1% Z-9-Tricosene) 6840-01-518-5807	CN 5 lb can	Premixed Bait (0.5%)	For outdoor use only. Distribute bait from container or other device. Avoid contact with skin, eyes and clothing. Scatter Application: Bait should be scattered over specified fly feeding areas (or military equivalent sites) daily or as needed. Scatter bait (do not put in piles) at the rate of approximately 0.5 lb per 1,000 sq ft of fly feeding area. Bait Stations: Place in any fly bait station. Use 1 bait station to cover ~250ft ² and add up to 1.6 oz of bait/station. Secure bait stations at least 4 feet above the ground. Paint on application: Mix 1.5 oz bait with 1 fl oz warm water, mix thoroughly to form paste. Apply with a brush to resting areas avoiding dusty surfaces.
QuickStrike Fly Strip (Starbar) 1% Nithiazine 6840-01-467-0994	BX of 12	Ready to Use as directed on label	Primarily For Outdoor use. May be used in stables, outdoor restroom facilities, and barns. Place in areas protected from moisture and direct sunlight if possible. Affix strips on stationary objects, close to the ground. Attachments sites include dumpsters, refuse bins, garbage chutes, walls, and other surfaces out of the reach of children and animals. Crush only one of the two attractant chambers at the time of application. Wait 3-4 weeks before crushing the second attractant chamber.
Lambda-cyhalothrin (SURRENDER PESTAB) 10.0% 6840-01-431-3357	CO 40 tablets per container	1 to 4 tablets/gal (0.015% - 0.06%)	For use as a general surface, spot application in and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Apply directly to walls, ceilings, window screens and other resting areas. May be used on exterior siding, foundations, porches window frames, eaves, and other similar sites. Also may be applied to lawn areas around residential buildings and similar areas where pests are active. Labeled for use on aircraft. Do not store dilution in application equipment overnight.

F. FLEAS

Flea Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Bifenthrin (Talstar P Professional) 7.9% 6840-01-525-6888	QT	0.25 -0.50 oz per 1000 sq ft (0.02-0.06%)	Outdoor use. Treat the entire area where ticks may occur. Apply 0.25-0.50 fl oz per 1,000 sq ft. If the lawn area is being treated at the 0.25 fl oz/1000 sq ft for adult flea control, the larval application rate may be achieved by increasing the application volume 2 to 4-fold. Otherwise, apply 0.5 – 1.0 fl oz per 1000 sq ft, when treating shaded areas that are accessible to pets or other animals to affect larval control.
Insecticide, Cyfluthrin (Tempo Ultra WSP) 10% WP 6840-01-383-6251	BX 32 (50 gram) packets	1 or 2 packets/5 gal (0.025% - 0.05%)	For outdoor use, apply at least 1 packet per 5000 sq ft of soil, turf or other locations where fleas are found. To prevent re-infestation, treat the building foundation, walls, and around doors, windows, and soffits where pest are active or may enter or hide, also treat the soil, turf or other substrates adjacent to buildings.
Cypermethrin (Demon WP) 35.6% 6840-01-390-4822	LB 1 lb jar	1 packet/gal 0.1%	For outdoor use only. Apply as a residual spray to surfaces of buildings, porches, screens, window frames, eaves, patios, and refuse dumps. Do not apply water-based sprays in conduits or electrical equipment because of the possible shock hazard. Do not use as a space spray.
Deltamethrin (DELTADUST) 0.05% 6840-01-431-3345	LB 1 lb jar	Apply as formulated	Apply indoors with a hand or power duster, paint brush or by other suitable means to non-food areas as a spot or crack and crevice treatment. Apply outdoors around building foundations and in crawl spaces where pests are active. Treat for a minimum of 5 days for light rodent populations, 10 days when populations are dense.
Lambda-cyhalothrin (SURRENDER PESTAB) 10.0% 6840-01-431-3357	CO 40 tablets per container	2 tablets/gal (0.03%)	Apply outdoors with hand or power sprayers as a residual spray to outside surfaces of buildings. May be applied to lawns around residential buildings and refuse dumps where pests are active. Don't store dilution in application equipment overnight.

G. BODY LICE

Body Lice Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
See Section A, Repellents for list of products that will prevent infestations of lice. NOTE: Head lice and crab lice are controlled using prescription products that can be obtained from medical treatment facilities or activities. Mass delousing capability for control of body lice is no longer conducted in the DoD. Laundering of infested clothing and/or use of FDA approved drugs and topically applied pediculicides are the approved measures for body louse control.			

H. MITES (CHIGGERS)

Mites (Chiggers) Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Cypermethrin (Demon WP) 35.6% 6840-01-390-4822	LB 1 lb jar	1 scoop/gal 0.1%	Apply outdoors as a residual spray to lawns, porches and in similar areas where chiggers are found. May not be applied in California to control chiggers.
See Section A, Repellents for list of products that will prevent mite infestations.			

I. MOSQUITOES (ADULTS)

Mosq (Adults) Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Bifenthrin (Talstar P Professional) 7.9% 6840-01-525-6888	QT	0.33-1.0 oz per 1000 sq ft (0.02-0.06%)	Outdoor use. Apply outside as a residual spray to surfaces of buildings, porches, screens, window frames, eaves, patios, and refuse dumps. Higher application volumes may be used to obtain desired coverage of dense vegetation and landscaping materials where files congregate. Do not apply water-based sprays in conduits, or electrical equipment because of the possible shock hazard. DO NOT use as a space spray.
Cyfluthrin (Tempo SC ULTRA) 11.8% 6840-01-313-7359	BX (12) 240ml bottles	8 - 16 ml/ 1000 sq ft	For use as a general surface or spot application in, on and around buildings. Make applications to surfaces where pests are seen. Labeled for use in aircraft. DO NOT use for space spray applications.
Cyfluthrin (Tempo Ultra WSP) 10.0% 6840-01-383-6251	BX 32 (50 gram) packets	1 or 2 packets/5 gal (0.025% - 0.05%)	For use as a general surface, spot application in and around buildings and structures. Spray around landscape plants, turf and ground cover, under decks, and around building foundations and other places mosquitoes may rest. Labeled for use on aircraft. DO NOT use for space spray applications.
Cypermethrin (Demon WP) 35.6% 6840-01-390-4822	LB 1 lb jar	1 packet/gal 0.1%	Apply outdoors only as a residual spray to surfaces of buildings, porches, screens, window frames, eaves, patios, and refuse dumps. Do not apply water-based sprays in conduits, or electrical equipment because of the possible shock hazard. DO NOT use as a space spray. May not be used to control mosquitoes in California.
d-Phenothrin 2% Aerosol 6840-01-412-4634	CN 12 oz cans	Pre-formulated Aerosol (2%)	Use as a space spray for aircraft disinsection, and in buildings, vans, ships, and in tentage. Spray 10 seconds per 1,000 cubic ft (10' x 10' x 10'). Not to be used on aircraft with passengers and crew aboard.
Lambda-cyhalothrin (SURRENDER PESTAB) 10.0% 6840-01-431-3357	CO 40 tablets per container	1 to 4 tablets/gal (0.015% - 0.06%)	For use as a general surface, spot application in and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Apply directly to walls, ceilings, window screens and other resting areas. May be used on exterior siding, foundations, porches window frames, eaves, and other similar sites. Also may be applied to lawn areas around residential buildings and similar areas where pests are active. Labeled for use in aircraft. DO NOT store dilution in application equipment overnight.

Mosq (Adults) Pesticide	Unit of Issue	Dilution & % Finished Concentrat e	Label Information
Malathion (Fyfanon ULV) 96.5% 6840-01-169-1842	5-gal can	Apply undiluted except for thermal fog/fog use	For outdoor use only in ground or aerial ULV equipment. For application with ground equipment 2-4 oz/acre. For use with thermal fogs or fogs, apply 6-8 oz/100 gallons of finished solution. Label includes extensive directions for application, equipment calibration, and droplet size determination. Spray droplets may permanently damage paint on vehicles.
Naled (Trumpet EC) 78% 6840-01-532-5414	30 gal drum	Apply undiluted	Aircraft application: Apply at the rate of 0.6 to 1.2 oz undiluted of diluted material per acre for smaller insects such as gnats and midges. Apply at the rate of 1 to 4 oz of undiluted material per acre for larger flies such as house flies. Use in residential areas, and municipalities, tidal marshes, swamps, woodlands, livestock and dairy cattle pastures, and feed lots. Ground Application: ULV Sprayer must be constructed out of corrosion-resistant materials.
Naled (Dibrom Concentrate) 87.4% 6840-01-270-9765	30 gal drum	Apply undiluted	Ultra Low Volume Aircraft Application: Apply ½ to 1 fluid oz undiluted product per acre. Use the 1 oz. rate where heavy vegetation exists. Aircraft should be equipped with a non-corrosive spray system.
Pyrethrins 3%, ULV Fog Concentrate 6840-01-104-0780	GL 1-gal can	As directed on label	Dilute concentrate with petroleum distillate at the rate of one part concentrate to two parts oil and mix well. Use at a time when the air is cool and the wind velocity is approximately 5 mph. Apply a dosage rate of fifteen ounces per minute upwind of the area to be controlled. If application equipment is truck mounted, keep speed approximately 5 mph.
Insecticide, Sumithrin-Piperonyl Butoxide (10%-10%), Anvil 10+10ULV, 6840-01-474-7751, or 6840-01-474-7706	(2) 2.5-gal co/BX, or 250 gal mini-bulk container	As directed on label	For use in ground and aerial ULV application equipment. Ground equipment must be capable of delivering majority of droplets in the 5 –25 micron range. Aerial application equipment must be capable of delivering droplets with an MMD of 50 microns or less with no more than 2.5% exceeding 100 microns. Do not apply when wind speeds exceed 10 mph (16 kph).
Resmethrin+piperonyl butoxide (Scourge) 4.14% + 12.42% 6840-01-359-8533	CN 5 gal	As directed on label	For outdoor use only in portable backpack, ground or aerial ULV equipment. Label includes extensive directions for application, equipment calibration, and droplet size determination. May apply using ULV portable backpack equipment, mix with refined soybean oil, light mineral oil of 54 second viscosity or other suitable solvent or diluent.
RESTRICTED USE PESTICIDE			
NOTE: Pesticides labeled for use against adult mosquitoes may be used to control other biting flies, as long as:			
<ul style="list-style-type: none"> • The target biting flies are at the same site as would be adult mosquitoes. • The pesticide is applied according to directions for use against adult mosquitoes. • The pesticide label does not prohibit use against the target pest. • All other applicable label directions and precautions are followed. 			

J. MOSQUITOES (LARVAE)

Mosquito (Larvae) Pesticide	Unit of Issue	Dilution & % Finished Concentration	Label Information
Mosquito Larvicide and Pupicide (Agnique MMF) 6840-01-467-1029	(2) 2.5-gal co	Apply as formulated	Apply 0.35-1.0 gal/acre to polluted water (sewage lagoons, percolation ponds, animal waster effluent lagoons, septic ditches, waste treatment ponds, etc.). Apply 0.2-1.0 gal/acre to brackish water, potable water and irrigation waters, permanent and semi-permanent waters, irrigated croplands, and pastures, and waters with outlets to natural water bodies, as well as to sewage lagoons, septic ditches, storm water basins, tree holes, rain barrels, and other containers. Use higher rates if vegetation is present. If the treated water surface is covered by the treatment film, control should be achieved. Pupicidal control occurs within 24 hrs and larval control within 96 hrs. Film typically persists 5 to 22 days.
<i>Bacillus thuringiensis israelensis</i> (Bactimos Briquets) 10% 6840-01-377-7049	BX Box/100 briquets	Apply per label directions (10%)	Use one briquette for up to 100 sq ft of surface area regardless of depth. In water with a high organic content, such as sewage disposal systems or waste lagoons, the application rate may have to be increased as much as four times the normal dosage based on evaluation by the user. Pre-flood treatment: Apply one briquette to each 100 sq ft of dry bed surface that is a known or suspected breeding site when flooded. Outdoor Use: Briquettes can be broken into portions for use in may outdoor applications, such as old automobile tires, rain barrels, ponds, abandoned pools, ditches, tree holes, roof gutters, flower pots or any other location where water collects and remains for periods of time. Use 1/4 briquette for 1 to 5 sq ft. Use 1/2 briquette for 5 to 25 sq ft. Use 1 briquette for 25 to 100 sq ft.
Methoprene (Altosid Liquid Larvicide, A.L.L.) 20% 6840-01-424-2493	CN 5 gal can	Apply 3/4 to 1 fl.oz/acre	A.L.L. is an insect growth regulator that has no effect on mosquitoes which have reached the pupal or adult stage. It must be applied to 2nd, 3rd, or early 4th larval instars of mosquitoes to prevent adult emergence. Treated larvae do not die but develop normally until to the pupal stage where they die. May be applied to pastures, rice fields, and intermittently flooded areas. Typical sites include freshwater swamps and marshes, woodland ponds and meadows, dredging spoil sites, drainage areas, waste treatment and settling ponds, ditches and other natural or manmade depressions. Around estuarine areas, treat high salt marsh or tidal marsh above high tide water level. In dense vegetation, apply A.L.L. sand mixture using standard dispersal equipment.
Methoprene (Altosid XR Extended Residual Briquettes) 1.8% 6840-01-424-2495	BX Box of 220 briquettes	Apply per label directions 1.8%	A.L.L. is an insect growth regulator that has no effect on mosquitoes which have reached the pupal or adult stage. It must be applied to 2nd, 3rd, or early 4th larval instars of mosquitoes to prevent adult emergence. Treated larvae do not die but develop normally until the pupal stage where they die. Apply at or before the mosquito season. One application should last the entire mosquito season (or 150 days). For <i>Aedes</i> and <i>Psorophora</i> , use 1 briquet/200 sq ft for shallow depressions. For <i>Culex</i> , <i>Culiseta</i> and <i>Anopheles</i> , place 1 briquet/100 sq ft. For <i>Coquillettidia</i> and <i>Mansonia</i> in cattail marshes and water hyacinth beds, place 1 briquet/100 sq ft. Briquettes control mosquitoes in small bodies of water that are not fish habitats (e.g., storm drains, catch basins, roadside ditches, cesspools, septic tanks, waste treatment settlement ponds, pastures, rice fields, freshwater marshes, salt/tidal marshes, woodland pools, flood plains, and dredge spoil sites).
Temephos (Abate 4E) 44.6% 6840-01-424-3132	GL (2) 2.5 gal containers	0.5 – 1.5 fl oz /Acre	Apply at lower application rates in clean water and higher application rates in waters high in organic matter content.

K. STORED PRODUCTS PESTS

Stored Product Pests Pesticide	Unit of Issue	Dilution & % Finished Concentrat e	Label Information
Cyfluthrin (Tempo SC ULTRA) 11.8% 6840-01-313-7359	BX (12) 240ml bottles	8 ml-16 ml/ 1000 sq ft or 8-16 ml/gal (0.025% - 0.05%)	For indoor use as a general surface, spot and crack and crevice application in buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Labeled for use in aircraft. Do not use for space spray applications.
Cyfluthrin (Tempo Ultra WSP) 10.0% 6840-01-383-6251	BX 32 (50 gram) packets	1 or 2 packets/5 gal (0.025% - 0.05%)	Apply where pests have been seen or found, or can find shelter. Use a general surface, spot, mist or crack and crevice application. For best results clean area before treating. For food storage areas remove utensils, exposed food, shelf paper and other items before spraying. When dried cover shelves with clean paper before replacing items. Labeled for use on aircraft. Do not use for space spray applications.
Deltamethrin (DELTADUST) 0.05% 6840-01-431-3345	LB 1 lb jar	Apply as formulated	Apply indoors with a hand or power duster, paint brush or by other suitable means to non-food areas as a spot or crack and crevice treatment.
Lambda-cyhalothrin (SURRENDER PESTAB) 10.0% 6840-01-431-3357	CO 40 tablets per container	1 to 4 tablets/gal (0.015% - 0.06%)	For use as a general surface, spot application in and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Also may be applied to lawn areas around residential buildings and similar areas where pests are active. Do not store dilution in application equipment overnight.
Pyrethrins 3%, ULV Fog Concentrate 6840-01-104-0780	1-gal can	As directed on label	As a space spray, use undiluted. Close room or warehouse and shut off all ventilation systems. Dispense this product as a fine mist in the air above fruit trays and shelves. Do not apply directly to food or fruit. Use a dosage not exceeding ½ gallon per 50,000 cubic feet of room space. Leave room closed for one hour. Do not remain in treated areas and ventilate before re-entry.

L. TICKS

Ticks Pesticide	Unit of Issue	Dilution & % Finished Concentrat e	Label Information
Bifenthrin (Talstar P Professional) 7.9% 6840-01-525-6888	QT	0.18 -1.0 oz per 1000 sq ft (0.02- 0.06%)	Indoor use. Apply as a course, low pressure spray to areas such as baseboards, pay particular attention to crack and crevices. Outdoor use. Treat the entire area where ticks may occur. Apply 0.5-1.0 fl oz per 1,000 sq ft. Use higher spray volumes when treating areas with dense ground cover or heavy leaf cover.
Cyfluthrin (Tempo SC ULTRA) 11.8% 6840-01-313-7359	BX (12) 240ml bottles	4 ml-6 ml/ 1000 sq ft (5.9-8.9 fl oz/Acre)	For outdoor use only as a general surface or spot application turf grass, fields, etc. and around buildings and structures. Make applications to areas where pests have been seen. Do not use for space spray applications. Do not apply when wind speed exceeds 15 mph (24 kph).
Cyfluthrin (Tempo Ultra WSP) 10.0% 6840-01-383-6251	BX 32 (50 gram) packets	1 or 2 packets/5 gal (0.025% - 0.05%)	For outdoor use only, as a general surface, spot application in and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Labeled for use on aircraft. Do not use for space spray applications.
Cypermethrin (Demon WP) 35.6% 6840-01-390-4822	LB 1 lb jar	1 packet/gal 0.1%	Apply indoors as a coarse, low-pressure spray where pests are found. Apply outdoors as a residual spray to lawns, porches and similar areas. May not be applied in California to control ticks.

Ticks Pesticide	Unit of Issue	Dilution & % Finished Concentrat e	Label Information
Deltamethrin (DELTADUST) 0.05% 6840-01-431-3345	LB 1 lb jar	Apply as formulated	Apply indoors with a hand or power duster, paint brush or by other suitable means to non-food areas as a spot or crack and crevice treatment. Apply in and around rodent burrows around homes and other buildings with a shaker can. Thoroughly apply dust to adequately cover mound around the perimeter (18" from the outer edge). Be sure to treat abandoned rodent burrows that are suspected to contain ticks. Treat for a minimum of 5 days for light rodent populations, 10 days when populations are dense.
Lambda-cyhalothrin (SURRENDER PESTAB) 10.0% 6840-01-431-3357	CO 40 tablets per container	1 to 4 tablets/gal (0.015% - 0.06%)	For use as a general surface, spot application in and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Also may be applied to lawn areas around residential buildings and similar areas where pests are active. Do not store dilution in application equipment overnight.

M. TERMITES

Termiticides	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Fipronil (Termidor 80 WG) 80% 6840-01-483-3072	BX (48 co/BX)	0.06-125%	For use ONLY by individuals licensed or registered by States/DoD to apply termiticide products. For the DoD this is Category 7, Industrial, Institutional, Structural, and Health-related. Can be used Pre-Construction and Post Construction
Fipronil (Termidor SC) 9.1% 6840-01-483-3068	BX (4) 78 oz bottles	0.06-125%	For use ONLY by individuals licensed or registered by States/DoD to apply termiticide products. For the DoD this is Category 7, Industrial, Institutional, Structural, and Health-related. Can be used Pre-Construction and Post Construction.
Bifenthrin (Talstar P Professional) 7.9% 6840-01-525-6888	QT	0.33-1.0 oz per 1000 sq ft (0.02- 0.06%)	When used as a termiticide, it may ONLY be used by individuals licensed or registered by States/DoD to apply termicide products. For the DoD this is Category 7, Industrial, Institutional, Structural, and Health-related. Can be used Pre-Construction and Post Construction.

N. ANTS

Ant Baits	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Fipronil (Maxforce FC Ant Bait Stations) .01% 6840-01-298-1222	PG 96 stations per pg	Apply as formulated	Indoor Use. Place 3 bait stations in an average size room. Place the stations adjacent to ant trails. Bait stations can be placed in cabinets, next to dishes, near sensitive equipment, where ants are found. Outdoor Use. Place bait stations adjacent to the building structure near ant activity. Application sites include air conditioning units, electrical pike chases, around ant mounds, and on the ground around structures near ant trails.

O. VENOMOUS ARTHROPODS

Venomous Arthropods Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Bifenthrin (Talstar P Professional) 7.9% 6840-01-525-6888	QT	0.33-1.0 oz per 1000 sq ft (0.02-0.06%)	Indoor use. Apply as a course, low pressure spray to areas where scorpions and spiders hide, such as baseboards, storage areas, closets, cracks and crevices. Outdoor use. Apply outside as a residual spray to surfaces of buildings, porches, screens, window frames, eaves, patios, and refuse dumps. Higher application volumes may be used to obtain desired coverage of dense vegetation and landscaping materials where files congregate. Do not apply water-based sprays in conduits, or electrical equipment because of the possible shock hazard. Do not use as a space spray.
Cyfluthrin (Tempo SC ULTRA) 11.8% 6840-01-313-7359	BX (12) 240ml bottles	16 ml/gal (0.05%)	Apply as a pin stream directly to bee, wasp, and hornet nests. Use as a drench or injection on fire ant mounds. Do not use for space spray applications.
Cyfluthrin (Tempo Ultra WSP) 10.0% 6840-01-383-6251	BX 32 (50 gram) packets	1 or 2 packets/5 gal (0.025% - 0.05%)	For use as a general surface, spot application in and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Labeled for use on aircraft. Do not use for a space spray applications.
Cypermethrin (Demon WP) 35.6% 6840-01-390-4822	LB 1 lb jar	2 packet/gal 2%	Outdoor use only. Apply as a residual spray to lawns, porches and in similar areas where pests are found. May not be applied in California to control ants (including carpenter and fire) or scorpions.
Deltamethrin (DELTADUST) 0.05% 6840-01-431-3345	LB 1 lb jar	Apply as formulated	Apply indoors with a hand or power duster, paint brush or by other suitable means to non-food areas as a spot or crack and crevice treatment. Apply along and behind baseboards, to window and door frames, corners, pipes, storage locations, attics, crawl spaces and other areas where these pests may enter or crawl. Apply outdoors thoroughly and uniformly to the foundation and crawl spaces where pests are active and may find entrance.
Lambda-cyhalothrin (SURRENDER PESTAB) 10.0% 6840-01-431-3357	CO 40 tablets per container	1 to 4 tablets/gal (0.015% - 0.06%)	For use as a general surface, spot application in and around buildings and structures and on various modes of transportation. Make applications to surfaces and other areas where pests have been seen. Also may be applied to lawn areas around residential buildings and similar areas where pests are active. Do not store dilution in application equipment overnight.
Pyrethrins, allethrin, d-phenothrin, or resmethrin, aerosol, (12) 17.5-oz cans (PT 515 Wasp Freeze & Hornet Killer or Wasp Stopper II Plus or Wasp and Hornet Killer II), 6840-00-459-2443	BX 12-17.5oz cans	Apply as formulated	Apply with wind at your back. Wasps and hornets: hold container in upright position to spray. Stand 6-12 feet from nest and not directly underneath. Align actuator opening at nest and spray until nest is thoroughly wet. Spray wasps and hornets on nest when possible. Best time to spray is in early morning or evening, since wasps and hornets congregate on or in nest at night. Do not apply to pets or contaminate food, foodstuffs, dishes or utensils. Avoid spraying plant foliage as injury may occur. For outside use only. Not a space spray. To prevent dying insects from falling on skin and clothing, do not stand directly under nest being sprayed. Yellow jackets and bees: locate underground nest. Align actuator opening away from mark on valve. Depress actuator and spray with a sweeping motion any insects around nest opening. Afterwards move forward to nest opening and spray liquid from 6 to 8 seconds directly into nest hole. This will suffocate bees in nests. Other bees trying to return to nest will be repelled and will fly away harmlessly. Spiders, including black widow and brown recluse: spray directly on spiders and web. This pesticide is toxic to fish. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark.

P. COMMENSAL RODENTS

Commensal Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Rodenticide, Anticoag., Univ. Conc., Diphacinone (0.05-0.055%) or Pindone (0.3-0.33%) or 2-sovalery-1,3 indandione (0.5-0.55%) 6840-00-753-4972	BX (50-1.7 oz Pouches)	Mix according to label	Both liquid and dry concentrates are available. Use according to label directions. Suggested bait materials are cornmeal or rolled oats. In dry areas, the liquid bait may be most effective due to scarcity of water. Maintain an uninterrupted supply of fresh bait until all signs of feeding have stopped.
Rodenticidal Bait, Anticoag., Diphacinone 0.005% 6840-00-089-4664	BX 40, 8 oz blocks	Use as Formulated (0.005%)	For use in CONEX containers, vans, and other military equipment and containers. Use 1 bait block per 5 linear feet of container length. Maintain an uninterrupted supply of fresh bait until all signs of feeding have stopped.
Rodenticidal Bait, Anticoag., Quick Kill Bromadiolone, (Maki pellets) 0.005% 6840-01-151-4884	CO 100 packs per CO	Use as Formulated (0.005%)	For control of domestic rodents in and around the periphery of dwellings, industrial, commercial, and public buildings. Do not use in sewers. Some labels permit use in and around transport vehicles (ships, trains, and aircraft) and related port or terminal buildings. For rats, use 5-16 oz bait per bait station (usually at 15-30 ft intervals). For mice only, use 0.25-2.0 oz per station, at 8 to 12 ft intervals. Maintain an uninterrupted supply of fresh bait until all signs of feeding have stopped.
Rodenticidal Bait, Anticoag., Quick Kill Brodifacoum, (Talon-G) pellets 0.005% 6840-01-508-6085	CO 5 lb per CO	Use as Formulated (0.005%)	For control of domestic rodents in and around the periphery of dwellings and public buildings. Do not use in sewers. For rats, use 5-16 oz bait per bait station (usually at 15-30 ft intervals). For mice only, use 0.25-2.0 oz per station, at 8 to 12 ft intervals. Maintain an uninterrupted supply of fresh bait until all signs of feeding have stopped.

NOTE: Apply bait in locations out of reach of children, pets, domestic animals and non-target wildlife, or in tamper-resistant bait stations. See Section IV Pesticide Dispersal Equipment for NSNs for rodent bait stations.

Q. VEGETATION CONTROL

Vegetation Control Pesticide	Unit of Issue	Dilution & % Finished Concentrate	Label Information
Herbicide, Isopropylamine salt of glyphosate, (Roundup Dry Pak) 0.96%, water soluble packets 6840-01-399-0673	BX (25 packets)	1 packet/gal, or As directed on label	Provides control of annual/perennial weeds, woody brush and trees. Has no soil residual activity. Use in and around airports, ditch banks, fence rows, industrial sites, warehouses, and other public areas. Apply to actively growing weeds. Apply using hand-held compressed air sprayers, back pack, or high volume sprayers. Avoid drift to desirable plants and crops. Does not provide residual weed control. For extended weed control, reapply when weeds reemerge.
Herbicide, Isopropyl salt of glyphosate, 41% water soluble liquid (Roundup Pro/ Ranger Pro/Glypos pro/ Razor Pro) 6840-01-108-9578	(2) 2.5 gal containers	As directed on label	Provides control of annual/perennial weeds, woody brush and trees. Has no soil residual activity. Use in and around airports, ditch banks, fence rows, industrial sites, warehouses, and other public areas. Apply to actively growing weeds. Apply using hand-held compressed air sprayers, back pack, or high volume sprayers. Avoid drift to desirable plants and crops. Does not provide residual weed control. For extended weed control, reapply when weeds reemerge.

IV. PESTICIDE DISPERSAL AND SURVEILLANCE EQUIPMENT

The most current list of pesticide dispersal and surveillance equipment is found on the [DoD Pest Management Material](#) list. All items may be suitable for contingency use by one or more of the Military Services. The list contains the most current products and prices.

V. SAFETY EQUIPMENT FOR PESTICIDE APPLICATORS

NSN	Safety Equipment for Pesticide Applicators: REMARKS
4240-00-759-3290	AURAL PROTECTOR, SOUND (protection against sustained noise levels above 85 db)
8430-00-241-2780	BOOTS, hip, black rubber (size 10)
8430-00-241-2781	BOOTS, hip, black rubber (size 11)
8430-00-241-2782	BOOTS, hip, black rubber (size 12)
8430-00-262-8256	BOOTS, hip, black rubber (size 9)
8430-00-262-8257	BOOTS, knee, rubber, 15 in. high (size 10)
8430-00-262-8258	BOOTS, knee, rubber, 15 in. high (size 11)
8430-00-262-8259	BOOTS, knee, rubber, 15 in. high (size 12)
8405-00-131-6507	COVERALLS, long sleeve, olive drab (SM)
8405-00-131-6508	COVERALLS, long sleeve, olive drab (MED)
8405-00-131-6509	COVERALLS, long sleeve, olive drab (LG)
8405-00-131-6510	COVERALLS, long sleeve, olive drab (XLG)
8415-01-012-9294	GLOVES, chemical and oil protective (Nitrile gloves for protection against pesticides). (size 9)
8415-01-013-7382	GLOVES, chemical and oil protective (Nitrile gloves for protection against pesticides). (size 10)
4240-00-190-6432	GOGGLES, industrial, non-vented. (For protection of eyes from pesticide splashes, mists, and sprays).
	3M Respirators
4240-01-495-1294	RESPIRATOR, half-face, 3M 7500 series (SM)
4240-01-495-1293	RESPIRATOR, half-face, 3M 7500 series (MED)
4240-01-495-1291	RESPIRATOR, half-face, 3M 7500 series (LG)
4240-01-314-2780	RESPIRATOR, full-face, 3M 7800 series (SM)
4240-01-342-5239	RESPIRATOR, full-face, 3M 7800 series (SM/MED)
4240-01-301-3200	RESPIRATOR, full-face, 3M 7800 series (MED/LG)
4240-01-246-5407	CARTRIDGE, organic vapor, pesticides, 3M P/N 6001 OV Cartridge fits 7500 & 7800 respirator
4240-01-389-7449	701 Cartridge filter adaptor...for use with 6001 OV Cartridge to use with 7800 respirator
	North Respirators
4240-01-249-9261	Respirator Half Face, 550030 series, P/N: 5501P95L-12 (LG)
4240-01-249-9262	Respirator Half Face, 550030 series, P/N: 5501N95M-12 (MED)
4240-01-249-9263	Respirator Half Face, 550030 series, P/N: 5501N95S-12
4240-01-249-2573	Organic Vapor Cartridge & P100 Particulate Filter (99.97% Minimum Filter Efficiency): P/N: 7581P100
4240-01-249-2572	P100 Particulate Filter (99.97% Minimum Filter Efficiency, P/N: 7580P100

Safety Equipment Usage Requirements

All pest control personnel must follow their Military Service's instructions and regulations. These include proper fit testing, wear, and storage requirements. Training is provided by safety, occupational health, military public health, or other qualified medical authority.

You are responsible for periodic inspection, cleaning, and proper storage of your assigned respirator.

- When storing a respirator:
 - * Protect it from dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals.
 - * Ensure the face-piece and exhalation valve is not damaged or subject to cramming or crushing.
 - * Do not store it in a toolbox or locker unless they are in a container or in a carton.
- Inspect and conduct fit testing (including a positive/negative pressure test):
 - * Before each use.
 - * After each use.
 - * Once a month if not used more frequently.

It is imperative for you to **immediately notify your supervisor if you detect a leak in your respirator**. Half-face respirators are suitable for most application techniques. Full-face respirators may be required to perform some pesticide applications.

Further, pesticide applicators must be placed on a medical surveillance program to test for pesticide absorption and other related pest control medical concerns. It is your responsibility to make these scheduled appointments prior to deployment.

VI. PERSONAL PROTECTIVE EQUIPMENT AGAINST DISEASE VECTORS

NSN	Personal Protective Equipment Against Vectors: REMARKS
3740-01-516-4415	Bed net, Pop-up, self-supporting low profile bed net (SSLPB). OD Green treated w/ permethrin repellent
3740-01-518-7310	Bed net, Pop-up, self-supporting low profile bed net (SSLPB). Coyote Brown treated w/ permethrin repellent
7210-00-266-9736	INSECT BAR, FIELD TYPE (Insect netting), 200" x 68", netting only (does NOT include optional poles, or rods w/clamps, listed below; poles or rods are required for use with cot)
7210-00-267-5641	POLES, FOLDING COT, INSECT NET PROTECTOR, wooden, for suspending insect bar netting (above) over folding cots
7210-00-359-4850	ROD, INSECT NET PROTECTOR. Two T-shaped metal rods, used to suspend the Insect Bar, Field Type. Rods may be pushed into the ground or used on cots if Insect Bar, Clamp (listed below) is also used.
7210-00-300-6950	CLAMP, INSECT NET PROTECTOR ROD. Used to Attach Insect Bar, Rods, above, to military cots. Required to clamp Rods to cot and erect the Insect Net Protector.
7210-00-266-9740	INSECT NET PROTECTOR, 27" x 77.5", Used to protect personnel from insects while sleeping, for use with military cots.
8415-00-935-3130	INSECT BAR, HEAD NET Used to protect head and neck from mosquitoes.
8415-00-935-2914	INSECT NET, HAT. Nylon Netting, AG323, Elastic Headwear Attachment.
8415-01-192-2357	INSECT NET, MITTENS. Head and hand covering; nylon; black; packaged in heat-sealed, waterproof bag.
3740-01-483-2988	Jacket, mesh, arthropod protective; Bug-Out outer wear, size Small, P/N 5460A; EFFECTIVE WITHOUT APPLICATION OF DEET.
3740-01-483-3002	Jacket, mesh, arthropod protective; Bug-Out outer wear, size Medium, P/N 5460B; EFFECTIVE WITHOUT APPLICATION OF DEET.
3740-01-483-3004	Jacket, mesh, arthropod protective; Bug-Out outer wear, size Large, P/N 5460C; EFFECTIVE WITHOUT APPLICATION OF DEET.
3740-01-483-3007	Jacket, mesh, arthropod protective; Bug-Out outer wear, size XL, P/N 5460D; EFFECTIVE WITHOUT APPLICATION OF DEET.
3740-01-483-3008	J Jacket, mesh, arthropod protective; Bug-Out outer wear, size XXL, P/N 5460E; EFFECTIVE WITHOUT APPLICATION OF DEET.

NOTE: See http://www.afpmb.org/pubs/standardlists/pest_management_material for more information and pictures of personal protective equipment.

VII. AIR-TRANSPORTABLE OVER PACK CONTAINERS

- A. Some pesticides come in containers that do not meet air transport requirements. Further, containers that have been opened, do not qualify for air shipment;
- B. Pesticides stored in reusable over-pack containers (cylindrical metal drums with re-sealable metal tops) may be transported by air.
 1. One-gallon rectangular cans (nominally 10 in. x 6 in. x 4 in. may be over-packed in the following container:
 DRUM, SHIPPING AND STORAGE, (12.9 in. ht. X 10.5 in. diameter) NSN 8110-00-254-5722, U/I – EA, Unit Price – about \$76.
 2. A standard five-gallon drum (nominally 13.8 in. ht. x 10.9 in. diameter) may be over-packed in the following container:
 DRUM, SHIPPING AND STORAGE (19.9 in. ht. x 15.4 in. diameter) NSN 8110-00-254-5716, U/I – EA, Unit Price – about \$50.
- C. Transportation regulations also require that the pesticide container inside the over-pack drum be cushioned with vermiculite or other absorbent material on the sides, top and bottom. Refer to Para A.20.1, AFJMAN 24-204/TM 38-250/NAVSUP PUB 505/MCO P4030-19G/DLAI 4145.3, Attachment 20. Personnel requiring assistance with cushioning material should contact the Air Force Packaging Technology and Engineering Facility, 5215 Thurlow Street, Wright Patterson AFB, OH, 45433-5440, (937) 257-4234/4519 or DSN 787-4234/4519. A suitable cushioning material is:
 Cushioning Material, Industrial; Untreated (VERMICULITE, ASTM C 516, Type I, grade 3), BAG, 4.5 lb , NSN 8135-01-324-2664; specify Part No A-A-52450 and Cage 58536. Cushioning material is 4.5 to 7 lbs. per cubic ft, density, suitable for packing hazardous chemicals or liquids. One bag of this material is adequate for over-packing three standard 5-gallon drums, each in the larger over-pack container, above. Approximately 7 one-gallon cans may be over-packed, each in the smaller container, with the material in one bag.

APPENDIX A: Dilution Formulas

DILUTION FORMULAS, WEIGHT-VOLUME BASIS FOR DILUTING SOLID CONCENTRATES TO MAKE SUSPENSIONS OR SOLUTIONS

Formula 1.	$W = \frac{8.34 \times G \times D}{C}$	Where: 8.34 = Constant (Weight on one gallon of water) W = Weight (lbs) of concentrate G = Gallons desired C = % of active ingredient in concentrate (expressed as a whole number for example 80% is expressed as 80)
Formula 2.	$G = \frac{W \times C}{8.34 \times D}$	D = % of active ingredient in finished spray (expressed as a whole number for example 2% is expressed as 2)
Formula 3.	$D = \frac{W \times C}{8.34 \times G}$	

Example:

How many pounds of 80% carbaryl wettable powder will be used to obtain 100 gallons of a 2% spray?

Using Formula 1. $W = \frac{8.34 \times G \times D}{C} = \frac{8.34 \times 100 \times 2}{80} = 20.85$ lbs of wettable powder

WEIGHT-WEIGHT OR VOLUME-VOLUME FOR DILUTING DUST IN DUST OR LIQUID IN LIQUID

Formula 4.	$VC = \frac{VT \times D}{C}$	Where: VC = Weight or volume of concentrate VT = Total weight or volume of the finished spray C = % of active ingredient in concentrate (expressed as a whole number for example 80% is expressed as 80)
Formula 5.	$VT = \frac{VC \times C}{D}$	D = % of active ingredient in finished spray (expressed as a whole number for example 2% is expressed as 2)
Formula 6.	$D = \frac{VC \times C}{VT}$	

Example:

How much 95% concentrate will you use to obtain 200 gallons of 1% malathion solution to be diluted with fuel oil?

Using Formula 4. $VC = \frac{VT \times D}{C} = \frac{200 \times 1}{95} = 2.1$ gallons = 2 gallons + 13 ounces

"SAD COW" FORMULA FOR DILUTING LIQUID CONCENTRATES PREPARED FOR POUNDS OF INSECTICIDE PER GALLON

"SAD COW" Formula $Q = \frac{S \times A \times D}{C \times W}$

Where:

Q = Quantity of concentrate required in gallons

S = Strength of percentage of active ingredient in finished spray

A = Amount of spray to be prepared in gallons

D = Density: weight of one gallon of diluent (usually water, 8.34 lb/gal)

C - Concentrate: percentage of active ingredient (constant), expressed as a whole number: 2% - "2"

W - Weight of actual insecticide (lb) in each gallon of concentrate

Example: How much liquid concentrate is required if 10 gallons of a 2 % emulsion are desired and the concentrate contains 8 lbs/gal active ingredient?

$Q = \frac{S \times A \times D}{C \times W} = \frac{2 \times 10 \times 8.34}{100 \times 8} = 166.8/800 = 0.21$ gallons (26.88 ounces)

Most insecticides are now sold with the label indicating pounds of insecticide per gallon and percentage of toxic materials. In such a case, the weight to weight formula is modified so that the factor C is considered technical grade insecticide (100% active ingredient), and a factor W (pounds of insecticide per gallon) is added.

APPENDIX B: Calculating Application Rates

LINEAR APPLICATION

For speed in mph given the flow rate (gallons per hour) and gallons required per linear mile.

$$\text{Speed} = \frac{\text{Flow rate}}{\text{Gallons per mile}}$$

AREA APPLICATION

For gallons required given gallons per acre, square feet in the area to be treated, and 43,560 feet per acre.

$$\text{Gallons} = \frac{\text{sq ft} \times \text{gals. per acre}}{43,560}$$

For speed in feet per minute given 43,560 feet per acre, flow rate per minute (gals), swath width (ft), and gallons per acre required.

$$\text{Speed} = \frac{\text{sq ft} \times \text{gals. per minute}}{\text{swath width} \times \text{gals. per acre}}$$

For gallons per acre given 43,560 feet per acre, flow rate per minute (gals), swath width (ft), and gallons per acre required.

$$\text{Gals/acre} = \frac{43,560 \times \text{gals. per min}}{\text{swath width} \times \text{speed}}$$

APPLYING A CERTAIN PERCENT OF PESTICIDE

(All percentages are expressed as whole numbers: 5% = "5")

1. Solutions or Emulsions.

$$\text{Gal of conc. to add} = \frac{\text{Gal of spray desired} \times \% \text{ desired} \times \text{Wt of diluent}}{\text{lbs. of technical grade per gallon} \times 100}$$

2. Suspensions.

$$\text{Pounds of WP to add} = \frac{\text{Gal of spray desired} \times \% \text{ desired} \times \text{Wt of diluent}}{\text{lbs. of technical grade per pound} \times 100}$$

3. Dusts or Dry Baits

$$\text{Pounds of conc. to add} = \frac{\text{Lbs of material desired} \times \% \text{ desired}}{\% \text{ of concentrate}}$$

APPLYING POUNDS OF ACTIVE INGREDIENT PER ACRE

1. Solutions or Emulsions.

$$\text{Gal of concentration to add} = \frac{\text{Recommended application rate (wt in lbs)} \times \text{number of acres to treat}}{\text{lbs. of technical grade per gallon}}$$

$$\text{Amt of dilute spray needed} = \frac{\text{Machine output (gal/min)} \times 500 \times \text{no. acres to treat}}{\text{swath width} \times \text{MPH}}$$

2. Wettable Powders, Dusts, Granules, or Baits.

$$\text{Amt of concentration to add} = \frac{\text{Recommended appl rate (wt in lbs)} \times 500 \times \text{no. acres to treat}}{\text{lbs. of technical grade per lbs of concentration}}$$

$$\text{Amt of dilute spray needed} = \frac{\text{Machine output (lbs of gal/min)} \times 500 \times \text{no. acres to treat}}{\text{swath width} \times \text{MPH}}$$

3. If the amount of dilute pesticide needed exceeds the capacity of the tank you are using, the amount of concentrate to be added per tankful can be calculated by:

$$\text{Amt of concentration to add per tankful} = \frac{\text{Amt of concentration to add} \times \text{tank capacity}}{\text{Amt of dilute pesticide needed}}$$

NOTE: The application rate and the amount of technical grade material per gallon must be in the same weight terms. That is, if the application rate is given in ounces, you must convert it to pounds before using formulas 1 or 2. If the application rate is given in ounces, read the pesticide label carefully to make sure the ounces refer to weight (16 oz/lb) and not liquid volume (128 oz/gal).

APPENDIX C: Conversion Factors, U.S. and Metric

LENGTH

1 mile = 1,760 yards = 5,280 feet	1.6 kilometers = 1,609 meters
1 mile (nautical) = 6,080.2 feet	1.8 kilometers = 1,853 meters
0.621 miles = 1,093.6 yards	1 kilometer = 1,000 meters
1 yard = 3 feet = 36 inches	91.4 centimeters = 0.91 meters
1.094 yards = 3.28 feet = 39.37 inches	1 meter = 100 centimeters
1 foot = 12 inches	0.3048 meter = 30.48 centimeters
1 inch	2.54 centimeters
0.394 inch	1 centimeter
0.0394 inch	1 millimeter = 1,000 microns
0.000039 inch	0.001 millimeter = 1 micron

TEMPERATURE SCALE

<u>C</u>	<u>0</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>	<u>35</u>	<u>40</u>	<u>45</u>	<u>50</u>	<u>55</u>	<u>60</u>	<u>80</u>	<u>100</u>
F	32	41	50	59	68	77	86	96	104	113	122	131	140	176	212

C = degrees Centigrade = $5/9 \times (\text{degrees Fahrenheit} - 32)$

F = degrees Fahrenheit = $32 + (9/5 \times \text{degrees Centigrade})$

AREA

1 Square mile = 640 acres	259 hectares
0.39 square mile = 247 acres = 100 hectares	1 square kilometer
2.47 acres = 1 hectare	10,000 square meters
1 acre = 4,840 sq yards = 43,560 sq ft	4,047 sq meters = 0.405 hectare
1.2 sq yards = 10.76 sq ft = 1,550 sq in.	1 square meter
1 square yard = 9 square feet	0.84 square meter
1 square foot = 144 square inches	0.093 sq meter = 930 sq centimeters
1 square inch = 0.007 square foot	6.45 square centimeters

VOLUME

1 cubic foot = 1728 cu in	0.037 cubic yards = 28.32 liters
1 cubic inch	0.000579 cubic foot = 16.39 cubic centimeters = 16390 cubic millimeters
1.307 cubic yards	35.29 cubic feet = 1 cubic meter = 1,000 liters
1 cord of wood	128 cubic feet

LIQUID CAPACITY

1 U.S. gallon = 231 cubic inches = 4 quarts	3.79 liters
0.26 U.S. gallon = 1.06 quart	1 liter = 1,000 milliliters
1 U.S. quart = 32 U.S. fluid ounces = 2 pints	0.9453 liter
1 pint = 16 fluid ounces = 2 cups	473.2 milliliters
1 tablespoon = 3 teaspoons = 0.5 U.S. fluid oz.	14.8 milliliters
1 cup = 16 tablespoons = 8 fluid ounces	236.6 milliliters

LIQUID CAPACITY

1 fluid ounce = 2 tablespoons

29.57 milliliters

WEIGHT

0.035 ounce

1 gram = 1,000 milligrams

1 ounce = 1/16 pound = 0.0625 lb

28.35 grams

1 grain = 1/7,000 pound

64.79 milligrams

1 pound = 16 ounces

453.6 grams

2.2 pounds = 35.37 ounces

1 kilogram = 1,000 grams

2,204 pounds

1 metric ton = 1,000 kilograms

1 U.S. ton (short) = 2,000 pounds

907 kilograms

1 U.S. ton (long) = 2,240 pounds

1,016 kilograms

APPENDIX D: Medical Entomology Points of Contact Overseas

COUNTRY	UNIT/ADDRESS	PHONE #	SERVICE
EGYPT (Cairo)	Commanding Officer NAMRU-3 PSC 452, Box 141 FPO AE 09835-0007	011-202-342-3090	USN
GERMANY (Landstuhl)	Commander Public Health Command Region-Europe (PHCR Europe) CMR 402 APO AE 09180	011-49-6371-86-8540 06371-86-8540 DSN 314-486-8540	USA
GERMANY (Ramstein)	HQ USAFE/A7CV Unit 3050, Box 10 APO AE 09094-5010	011-49-6371-47-6382 DSN 314-480-6382	USAF
HAWAII (Honolulu)	Tripler Army Medical Center Preventive Medicine Activity Honolulu, HI 96859-5000	808-433-6693/6731 DSN 433-6694/6731	USA
HAWAII (Pearl Harbor)	Officer-in-Charge NEPMU-6 1215 North Road, Building 1535 Pearl Harbor, HI 96860	808-473-0555 DSN 315-473-0555	USN
HAWAII (Pearl Harbor) (formerly INDONESIA, Jakarta)	Officer-in-Charge NAMRU-2 1215 North Road Pearl Harbor, HI 96860 (temporary address)		USN
JAPAN (Okinawa)	DET 3 AFIOH Unit 5213, Box 10 APO AP 96368-5213	011-81-611-734-2639 DSN 315-634-2639	USAF
JAPAN (Camp Zama)	Commander PHCR-Pacific APO AP 96343-5006	011-81-3117-63-8446 DSN 315-263-8446	USA
JAPAN (Okinawa)	3rd Medical Battalion/3d MLG Unit 38447 FPO AP 96604-8447	011-81-611-723-7809 DSN 315-623-4273	USN

COUNTRY	UNIT/ADDRESS	PHONE #	SERVICE
KENYA (Nairobi)	Commander USAMRU-K Box 401 APO AE 09831-4109	011-254-2-630600	USA
KOREA (Seoul)	Commander 5 th MED DET PM (ENTO) Unit 15247 APO AP 96205-0020	011-822-7915-4927 DSN 315-725-4927	USA
KOREA (USAG Humphreys)	Commander PHCR-Pacific (Korea) APO AP 96271-5190	DSN 315-753-3747	USA
PERU (Lima)	Officer-in-Charge NMRC-D-Lima Unit 3800 APO AA 34031	011-51-1-562-3848 x 133	USN
THAILAND (Bangkok)	Commander U.S. Army Medical Component AFRIMS APO AP 96546	011-66-2-644-5777	USA

Commercial telephone numbers provided assume calls originate from CONUS. If this is not the case, replace the "011" with the appropriate prefix for an international call from your location.

APPENDIX E: DoD Repellent System

The best strategy for defense against diseases transmitted by arthropods is the use of all elements of the DoD Repellent System. This includes the application of extended-duration DEET lotion to exposed skin, coupled with wearing permethrin-treated uniform is a key component of this system. *When used with a properly worn uniform, this system will provide nearly complete protection from arthropod-borne diseases.*

Three formulations of permethrin are available in the national stock system. Permethrin Aerosol, NSN 6840-01-278-1336, is effective for only about 6 weeks or 6 washings. However, the remaining two products and factory treated permethrin uniforms provide protection for the life of the uniform. The two other individual level permethrin products available are: Insect Repellent, Application, permethrin, IDA Kit, NSN 6840-01-345-0237 which uses a re-sealable baggie system to treat the BDU/ACU/ABU components; and the Insect Repellent, Clothing Application, 40% permethrin, 2 gallon sprayer method, NSN 6840-01-334-2666, intended for use by trained personnel to treat about 8 uniform sets per bottle. ***All of these permethrin products are applied to the uniform according to label directions, NOT directly to the skin.*** DO NOT use on hats, headgear, socks, underwear, or NOMEX uniforms. The individual soldier treatment of permethrin does not apply evenly on flame resistant clothing: Flame Resistant ACU (FRACU), Army Air Crew Combat Uniform (A2CU), Combat Vehicle Crewman (CVC) Coveralls solid color and 27P Flyers coveralls due to uneven absorption in the fabric. Permethrin DOES NOT affect flame resistant properties but uneven application will not provide proper insect protection. After many years of research, the Army will issue permethrin pre-treated Flame Resistance ACU (FRACU) to deploying soldiers. A single factory treatment with this repellent offers significant benefits to the FRACU wearer including increased safety and improved effectiveness against bites from mosquitoes, sand flies, midges, ticks and chiggers for the life of uniform.

Many units prefer to use the aerosol method as it appears to be the easiest to use. However, it is the most expensive method for impregnating uniforms with permethrin. Because it only lasts about 6 weeks or 6 washings, it must be reapplied several times in a given season even in temperate climates. This drives up the cost per uniform of application significantly as compared to the other methods (e.g. IDA, 2-gallon sprayer or factory-treated uniforms) which result in protection for the life of the uniform.

An extended formulation lotion of diethyl-m-toluamide (DEET) (NSN 6840-01-284-3982) contains 33% active ingredient, provides 8-12 hours of protection, is less irritating to the skin, and has less odor than the older 75% DEET product. In addition, two other formulations of DEET are now available that may be more readily tolerated by personnel and thus used more consistently. They are Ultra 30/LipoDEET lotion (NSN 6840-01-584-8393) and Cutter Pump Spray Repellent (NSN 6840-010584-8598).

Combined use of extended duration DEET on exposed skin and permethrin on uniform items has been demonstrated in laboratory and field studies to provide nearly complete protection against a variety of blood-sucking arthropods. In addition, permethrin may be applied to bed nets, tentage (GP canvas type tents rather than Base-X shelters) and other field items as appropriate.

Camouflage Face Paint plus DEET is also available in DoD repellent system. This product, NSN 6840-01-493-7443, contains (30% DEET) with Camouflage Face Paint and can provide 8-12 hours of insect repellency and provide near infrared signature reduction.

APPENDIX F: USAF Aerial Spray Contingency Capability

Large area aerial spray (LAAS) capability has a long history of successfully supporting military missions that date back to World War II. Current Air Force C-130 based assets provide unequalled capability to control 90-99% of disease vectors while covering 2 square miles per minute. Reference (a) lists 83 diseases of military importance with 2/3 of them (53) being vectored or carried by insects and other arthropods. High risk vector-borne diseases, especially malaria and dengue fever (limited aerial spray effectiveness for dengue fever), makes them potential war stoppers in large areas of the world (references b & c). Medical planners estimating worst case scenarios for military operations in semi-tropical and tropical regions should plan for the deployment of Air Force LAAS to provide maximum support for prevention of vector-borne disease in accordance with reference (d) and Operational Requirements.

Numerous situations can develop in an operational contingency which would make LAAS the method of choice for vector control operations:

- Environmental conditions (i.e. flooding or limited road access) could make ground control methods unfeasible or too slow to effect disease control over a wide area.
- Disease epidemics or potential outbreaks require swift control of vectors to break the disease cycle and stop the epidemic.
- Post-conflict ground vector control operations may remain too hazardous in many areas until mines and booby traps can be cleared.
- Natural disasters such as hurricanes and earthquakes create humanitarian relief situations where LAAS could prevent the spread of vector-borne disease or stop an ongoing epidemic.

Concept of Operation

- Two early-morning or late afternoon sorties each day using two aircraft at 100-300 feet AGL can effectively control 90-99% of disease vectors and pest insects.
- Can apply liquid larvicides for long term mosquito control.
- Normal swath widths of 1,000 - 3,000 feet over secure areas can treat 2 square miles per minute.
- Over non-secure areas, stand-off swath widths of up to 2.5 miles result in coverage of 20 square miles per minute by controlled drift.
- Four Modular Aerial Spray Systems (MASS) are available.
- Four C-130 aircraft are outfitted to accept the MASS.

Potential areas for use of C-130 aerial spray are:

- Troop and equipment staging areas for return to CONUS, including a buffer area to reduce disease vector re-infestations.
- In-theater troop concentration sites with potential vector-borne disease problems within the combat zone and communication zone of the theater. Refugee/EPW holding areas.
- Airfields.

Requests for LAAS should include:

- Location of spray area with map coordinates, or boundaries marked on a map, or GPS UTM coordinates.
- Spray timing requested (date and time).
- Acreage to be sprayed including a buffer zone.
- Point of contact, with phone number if possible.
- Target disease vectors or pests to be controlled.
- Hazards (Low-level flight or enemy).

Statements of Need for this support flow through the Major Component Command Surgeon's office to the Office of the Surgeon for the CINC. Direct liaison with aerial spray personnel may be authorized at the discretion of the respective surgeons.

Information must be provided to all unit commanders and ground forces regarding the purpose and timing of the spray missions.

CONUS POC's are:

- US Air Force: 910th Airlift Wing, Aerial Spray Unit, DSN 346-1965/1412/1793, Commercial (330) 609-1965/1412/1793
- Armed Forces Pest Management Board, Contingency Liaison Officer, DSN 295-8312/7476, Commercial (301) 295-8312/7476, Fax 7473.

References:

- a. Handbook of Diseases of Military Importance, Defense Intelligence Agency, Pub. DST-1 81 OH-001-8.
- b. World Malaria Situation, World Health Organization, Weekly Epidemiological Record, 22 Jun 90.
- c. Halstead, S.B., Global Epidemiology of Dengue Hemorrhagic Fever, S.E. Asian J. Trop. Med. Pub. Health, Dec 1990.
- d. DoD Instruction 4150.07, "DoD Pest Management Program," 29 May 2008.
- e. AFI 32-1074 "Aerial Application of Pesticides", May 1, 1998.
- f. AFJMAN 24-204/TM 38-250/NAVSUP PUB 505/MCO P4030.19G/DLAI 4145.3, "Preparing Hazardous Materials for Military Air Shipment," 1 March 1997.

APPENDIX G. Approval For Local Purchase of Pesticides During Military Deployment Operations

Except where an emergency exists as determined by the Task Force Commander, only pesticides listed on the DoD Contingency Pesticide List shall be used during contingency operations. During emergency conditions, non EPA-registered pesticides may be procured locally, but only after approval as outlined below.

To locally purchase a pesticide that is NOT on the DoD Contingency Pesticide List (for emergency use only):

1. **If the pesticide is EPA-registered** - Approval by a DoD Pest Management Professional (PMP) and approval by the Task Force Surgeon is required.

2. **If the pesticide is not EPA-registered:**

A. If the active ingredient and formulation **ARE** on the DoD Contingency Pesticide List: Approval in writing from a PMP and Task Force Surgeon is required. Following approval, the PMP shall provide English language translations of labels and appropriate product information to users and supporting medical treatment personnel.

B. If the active ingredient and formulation is NOT listed on the DoD Contingency Pesticide List:

(1) The PMP and Task Force Surgeon shall request approval from the Armed Forces Pest Management Board prior to procurement. Contact the AFPMB Contingency Liaison Officer at DSN 295-8312, Commercial (301) 295-8312, Fax 7473.

(2) If approved, the PMP shall provide English language translations of labels and appropriate product information to users and supporting medical treatment personnel.

NOTE: Definition PMP, DoDI 4150.07 - Pest Management Professional - DoD military officers commissioned in the Medical Service or Biomedical Sciences Corps or DoD civilian personnel with college degrees in biological, physical or agricultural sciences whose current job includes pest management responsibilities DoD civilian employees shall also meet Office of Personnel Management (OPM) qualification standards. Based on assignment, some professional pest management personnel are pest management consultants. Some duties of the pest management professional require DoD pesticide applicator certification. These requirements are specified in DODI 4150.07, Enclosure 4, paragraph E4.4.2.4.

APPENDIX H: Country Specific Pest Management Information

The Information Services Division (ISD), AFPMB publishes Disease Vector Ecology Profiles (DVEPs) which are concise summaries of the vector-borne diseases that occur in specific countries or regions that emphasize essential epidemiology, vector bionomics, behavior, and pesticide resistance. Single country DVEPs are being replaced by regional DVEPs. The first regional DVEPs include: The Middle East; North Africa; Central Europe.

DVEPs are reviews of relevant entomological and arthropod-borne disease information for, among others, medical planners and military entomologists. Compiled from unclassified scientific literature, they are intended to provide a historical profile of arthropod-borne disease epidemiology in the recent past for selected geographical areas, and should be supplemented with recent information on foreign public health status and medical developments. Component medical department activities may have updated regional information for their areas of responsibility.

Current disease risk assessments, additional information on parasitic and communicable diseases, and other medical intelligence can be obtained from the National Center for Medical Intelligence (NCMI), Fort Detrick, Frederick, MD 21701 (301-619-7511, or DSN 343-7511). NCMI produces the Medical, Environmental, Disease, Intelligence, and Countermeasures (MEDIC), which includes basic disease threat information, in a CD-ROM format. MEDIC is updated annually.

The Navy Entomology Center of Excellence (NECE) at P.O. Box 43, NAS JAX, Jacksonville, FL 32212 – at DSN 942-2424, Commercial (904) 542-2424, Fax 4324; E-Mail NECE-OPSdept@med.navy.mil also provides pre-deployment or reach-back vector-borne disease prevention and control support.

DVEPs are designed to complement documents obtained from NCMI and Navy and Marine Corps Public Health Center (NMCPHC). In addition to DVEPs, ISD can provide bibliographic literature searches of its extensive, worldwide databases on pest management, medical entomology, and pesticide toxicology. ISD also conducts supplementary on-line computer searches of other biomedical databases for the most recently published information. Request services in writing to ISD, Armed Forces Pest Management Board, WRAMC Forest Glen Annex Bldg 172, 6900 Georgia Ave., NW, Washington, D.C. 20307-5001, by phone (24 hours/day) (301-295-7479, DSN 295-7479) or fax (7483).

Contingency information may also be obtained over the internet by accessing the AFPMB home page: <http://www.afpmb.org>.